

# SANblade 2300 Series User's Guide

2-Gb Fibre Channel to PCI-X Host Bus Adapters

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# Section 1

## Introduction

### 1.1

#### How to Use this Guide

The SANblade QLogic host bus adapters (HBAs) supported in this document are described in the following paragraphs; they are collectively referred to as the **QLA23xx HBA** unless otherwise noted. These HBAs are all low-profile, 64-bit PCI to Fibre Channel optical media.

- **QLA2340** (single channel, full-height bracket)
- **QLA2340L** (single channel, low-profile bracket)
- **QLA2342** (dual channel, full-height bracket)
- **QLA2342L** (dual channel, low-profile bracket)

First, install the QLA23xx HBA according to the directions in the appropriate hardware installation section. Secondly, install the software driver according to the directions in the appropriate section.

### 1.2

#### General Description

Thank you for selecting the QLA23xx Fibre Channel (FC) HBA. The QLA23xx HBA is an intelligent, high-performance, DMA bus master host adapter designed for high-end systems. The intelligence and performance are derived from the ISP23xx chips, making the QLA23xx HBA a leading-edge host adapter. The ISP23xx combines a powerful RISC processor, a Fibre Channel protocol manager (FPM) with one 2-Gb Fibre Channel transceiver, and a peripheral component interconnect-extended (PCI-X) local bus interface in a single-chip solution. The QLA23xx HBA supports all FC peripherals that support private loop direct attach (PLDA) and fabric loop attach (FLA). Installation of the QLA23xx HBA is quick and easy.

### 1.3

#### What is Fibre Channel?

Fibre Channel technology is outlined in the *SCSI-3 Fibre Channel Protocol* (SCSI-FCP) standard. Fibre Channel is a high-speed data transport technology used for mass storage and networking. It connects mainframes, super computers, workstations, storage devices, and servers.

Fibre Channel supports data transfer rates up to 200 MBps half-duplex and 400 MBps full-duplex on copper and optical interfaces. The QLA23xx HBAs use a multimode optical interface for intermediate distances (less than 500 meters at the data rate of 1 Gbps; less than 300 meters at the data rate of 2 Gbps).

With its increased connectivity and performance, Fibre Channel is the I/O technology preferred and used by system designers.

## 1.4 Features

- Compliance with *PCI Local Bus Specification* revision 2.2
- Compliance with *PCI-X Addendum (revision 1.0) to the PCI Local Bus Specification*
- Compliance with *Third Generation Fibre Channel-Physical and Signaling Interface (FC-PH-3)* standard
- Compliance with *Fibre Channel-Arbitrated Loop (FC-AL-2)* standard
- Compliance with U.S. and international safety and emissions standards
- Support for bus master DMA
- *Fast!UTIL* BIOS utility to customize the configuration parameters on the QLA23xx HBA and attached drives
- Two independent channels on a single HBA
- Supports Fibre Channel protocol-SCSI (FCP-SCSI), IP, and Fibre Channel-virtual interface (FC-VI) protocols
- Supports point-to-point fabric connection (F-PORT FABRIC LOGIN)

# ***Part I***

## **Hardware**

This part of the *SANblade 2300 User's Guide* describes the host bus adapters (HBAs) and how to install and configure them. See the section that corresponds to your HBA. [Section 4](#) contains troubleshooting information.

<b>HBA</b>	<b>Section</b>
QLA2340/2340L	<a href="#">2</a>
QLA2342/2342L	<a href="#">3</a>



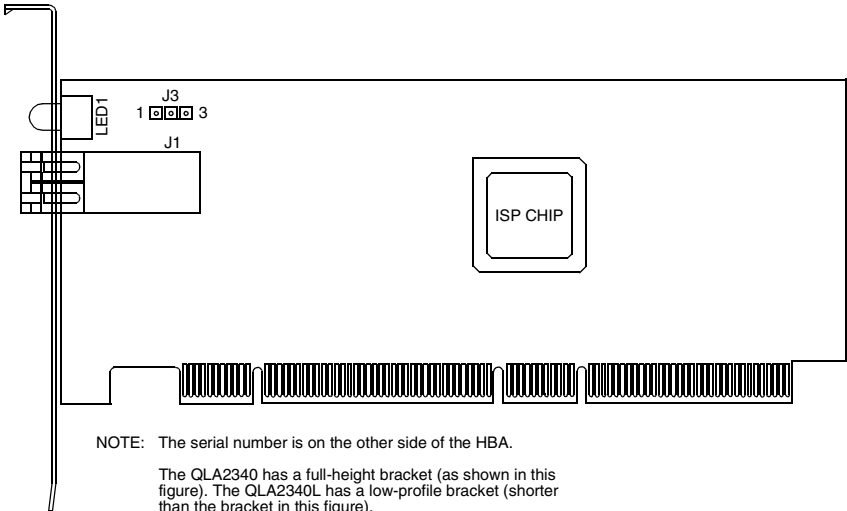
## Section 2

# QLA2340/2340L

### 2.1 QLA2340/2340L HBA Components

Figure 2-1 identifies the QLA2340/2340L HBA components referenced throughout this section.

Each QLA2340/2340L HBA has a unique serial number; its location on the HBA is noted in figure 2-1. Take a minute to write down the serial number of the QLA2340/2340L HBA.



**Figure 2-1. QLA2340/2340L HBA Layout**

### 2.1.1 LEDs

Figure 2-2 identifies and describes the activity of the QLA2340/2340L HBA LEDs.

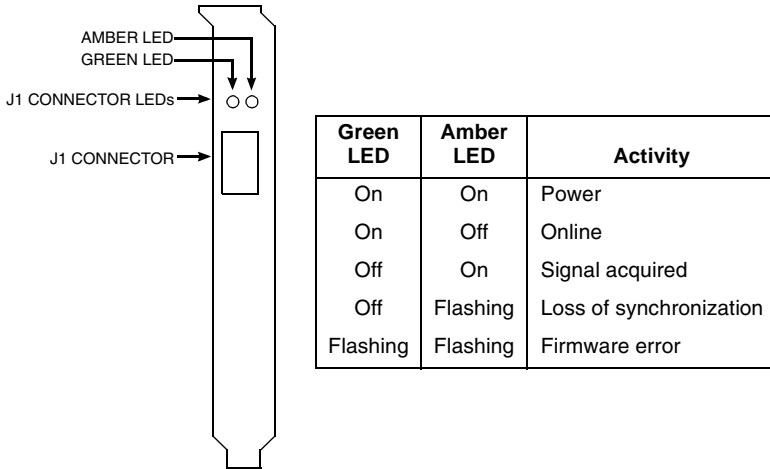


Figure 2-2. QLA2340/2340L HBA LED Activity

### 2.1.2 Jumpers

The jumpers on the QLA2340/2340L HBAs set the default state of the laser and are set at the factory with a jumper plug on pins 2–3 of the J3 jumper.

**CAUTION!** Changing the jumper settings can result in the HBA being inoperable.

## 2.2 Installation in the Computer

Before you install the QLA2340/2340L HBA in your computer, you need the following:

- A screwdriver (usually a Phillips #1)
- An optical multimode cable with an LC-style duplex connector

**CAUTION!** The QLA2340/2340L HBA contains parts that can be damaged by ESD. Before handling the QLA2340/2340L HBA, use standard methods to discharge static electricity. Keep the QLA2340/2340L HBA in the antistatic bag until you are ready to install it. Place the HBA on the bag when you examine or configure it. Retain the bag for future use.

Perform the following steps to install the QLA2340/2340L HBA in your PC:

1. Check the motherboard and make any configuration changes necessary to accommodate the QLA2340/2340L HBA.

The QLA2340/2340L HBA is self-configuring; however, some motherboards require manual configuration. For example, some systems have a **PCI Device Configuration** menu in the motherboard setup BIOS where you must enable HBAs, bus master slots, and IRQ levels. If the motherboard supports triggering, use *level triggering* for the QLA2340/2340L HBA. See the documentation supplied with your computer, or contact your computer dealer to determine if your motherboard requires configuration.

2. Power down the peripherals, then the computer.
3. Remove the computer cover and save the screws.
4. Choose any PCI bus slot that supports bus mastering. Most motherboards automatically assign an IRQ level and interrupt line; if your motherboard does not, you must assign the IRQ level and use *interrupt line A* for this slot.

**NOTE:**

- Some motherboards have two kinds of PCI bus slots: master and slave. The QLA2340/2340L HBA must be in a PCI bus master slot. (Some motherboards have PCI bus master slots that are shared with onboard devices. QLA2340/2340L HBAs do not work in shared slots.)
- PCI connectors vary among system HBA manufacturers. The QLA2340/2340L HBA is a 64-bit PCI device that can function in a 32-bit PCI slot; the slot conforms to the PCI specification (the rear edge of the PCI slot is notched). If you try to install the QLA2340/2340L HBA into a PCI slot that does not conform to the PCI specification, you may damage the QLA2340/2340L HBA.
- PCI and PCI-X slots look the same. If the PC contains both PCI and PCI-X slots, refer to the PC manufacturer's instructions to determine the slot type.
- The QLA2340/2340L HBAs are designed and tested to operate at PCI bus speeds of up to 133 MHz.

5. Remove the slot cover for the slot in which you will install the QLA2340/2340L HBA.
6. Place the QLA2340/2340L HBA into the slot. Carefully press the HBA into the slot until it seats firmly.
7. Secure the QLA2340/2340L HBA to the chassis. Follow the PC manufacturer's instructions.

8. Connect the appropriate cable from the devices to the corresponding connector.
9. Carefully reinstall the computer cover. Insert and tighten the computer cover screws.
10. Power up all external FC devices, then power up the PC and observe the monitor. The BIOS is disabled by default. Consequently, the devices attached to the QLA2340/2340L HBA are not identified. For example:

```
QLogic Corporation
QLA23xx PCI Fibre Channel ROM BIOS Version x.xx
Copyright (C) QLogic Corporation 2000 All rights reserved.
www.qlogic.com
```

```
Press <CNTRL-Q> for Fast!UTIL
```

```
BIOS for Adapter 0 is disabled
```

```
ROM BIOS not installed
```

**NOTE:**

- SunSPARC systems do not display the BIOS banner.
- Enable the BIOS only if the boot device is attached to the QLA2340/2340L HBA. This allows the system to boot faster.
- For further information about enabling the QLA2340/2340L HBA BIOS, [see section 2.3](#).

If the information displayed on your monitor is correct, congratulations! You have successfully installed the QLA2340/2340L HBA in your computer.

If you need FCode (Solaris SPARC systems), see [section 2.4](#) for instructions on how to install or update the FCode on the QLA2340/2340L HBA.

See the appropriate section for detailed instructions on how to install the software drivers.

If the information displayed is not correct and you have checked the QLA2340/2340L HBA's configuration, [see section 4](#) for troubleshooting information.

## 2.2.1 Installation Help

If your system has an IDE hard disk, it may be assigned device number 80, which is the boot device. If your system does not have an IDE hard disk, a parallel SCSI host bus adapter (HBA), or a RAID adapter, the first bootable FC hard disk configured (the one with the lowest ID) is assigned device number 80 and becomes the boot device. The QLA2340/2340L HBA BIOS must be enabled if the boot device is connected to the QLA2340/2340L HBA.



If you have a selectable boot BIOS and want to boot to an FC hard disk, set the motherboard BIOS parameters to None or Not Installed. The ROM BIOS on the QLA2340/2340L HBA automatically configures the FC peripherals.

Some new system BIOSs support selectable boot, which supersedes the QLA2340/2340L HBA BIOS selectable boot setting. Select the QLA2340/2340L HBA FC hard disk in the system BIOS to boot from an FC hard disk attached to the QLA2340/2340L HBA.

## 2.3

### **Fast!UTIL**

**NOTE:** The *Fast!UTIL* BIOS utility does not run on SunSPARC systems. Refer to [section 2.4](#) for information regarding adapter configuration settings and for installing FCode on a QLA2340/2340L HBA in a SunSPARC system.

#### 2.3.1

### **Introduction**

This appendix provides detailed configuration information for advanced users who want to customize the configuration of the QLA2340/2340L HBA and the connected devices.

The QLA2340/2340L HBA can be configured using *Fast!UTIL*, QLogic's BIOS-resident configuration tool. Access *Fast!UTIL* by pressing CNTRL+Q during the QLA2340/2340L HBA BIOS initialization (it may take a few seconds for the **Fast!UTIL Options** menu to display). If you have more than one QLA2340/2340L HBA, *Fast!UTIL* asks you to select the QLA2340/2340L HBA you want to configure. After changing the settings and exiting the utility, *Fast!UTIL* restarts your system to load the new parameters.

**CAUTION!** If the configuration settings are incorrect, your QLA2340/2340L HBA may not function properly.

The following sections describe the *Fast!UTIL* options.

#### 2.3.2

### **Configuration Settings**

The first selection on the **Fast!UTIL Options** menu is **Configuration Settings**. These settings configure the FC devices and the QLA2340/2340L HBA to which they are attached.

### 2.3.2.1

## Host Adapter Settings

From the **Configuration Settings** menu in *Fast!UTIL*, select **Host Adapter Settings**. The default settings for the QLA2340/2340L HBA are listed in [table 2-1](#) and described in the following paragraphs.

**Table 2-1. Host Adapter Settings**

Setting	Options	Default
<b>Host Adapter BIOS</b>	Enabled, Disabled	Disabled
<b>Frame Size</b>	512, 1024, 2048	2048
<b>Loop Reset Delay</b>	0–60 seconds	5 seconds
<b>Adapter Hard Loop ID</b>	Enabled, Disabled	Disabled
<b>Hard Loop ID</b>	0–125	0
<b>Spin Up Delay</b>	Enabled, Disabled	Disabled

- **Host Adapter BIOS.** When this setting is Disabled, the ROM BIOS on the QLA2340/2340L HBA is disabled, freeing space in upper memory. This setting must be enabled if you are booting from an FC hard disk attached to the QLA2340/2340L HBA. The default is Disabled.
- **Frame Size.** This setting specifies the maximum frame length supported by the QLA2340/2340L HBA. The default size is 2048, which provides maximum performance for F-Port (point-to-point) connections.
- **Loop Reset Delay.** After resetting the loop, the firmware refrains from initiating any loop activity for the number of seconds specified in this setting. The default is 5 seconds.
- **Adapter Hard Loop ID.** This setting forces the adapter to attempt to use the ID specified in the Hard Loop ID setting. The default is Disabled.
- **Hard Loop ID.** If the Adapter Hard Loop ID setting is enabled, the adapter attempts to use the ID specified in this setting. The default ID is 0.
- **Spin Up Delay.** When this setting is Enabled, the BIOS waits up to 5 minutes to find the first drive. The default is Disabled.

### 2.3.2.2

## Selectable Boot Settings

The **Selectable Boot Settings** option is accessed from the **Configuration Settings** menu. If you enable this option, you can select the node name from which you want to boot. Once enabled, this option forces the system to boot on the selected FC hard disk, ignoring any IDE hard disks attached to your system. If you disable this option, the system looks for a boot device (as selected in the system BIOS). In disabled mode, the Boot ID and Boot LUN parameters have no effect.

Some new system BIOSs support selectable boot, which supersedes the *Fast!UTIL* selectable boot setting. To boot from an FC hard disk attached to the QLA2340/2340L HBA, select the QLA2340/2340L HBA FC hard disk on the system BIOS.

**NOTE:** This option applies only to hard disks; it does not apply to tape drives and other nondisk devices.

### 2.3.2.3 Restore Default Settings

The **Restore Defaults** option from the **Configuration Settings** menu restores the QLA2340/2340L HBA default settings.

### 2.3.2.4 Raw NVRAM Data

This option displays the adapter's NVRAM contents in hexadecimal format. This is a QLogic troubleshooting tool; you cannot modify the data.

### 2.3.2.5 Advanced Adapter Settings

From the **Configuration Settings** menu in *Fast!UTIL*, select **Advanced Adapter Settings**. The default settings for the QLA2340/2340L HBA are listed in [table 2-2](#) and described in the following paragraphs.

**Table 2-2. Advanced Adapter Settings**

Setting	Options	Default
Execution Throttle	1–256	16
Fast Command Posting	Enabled, Disabled	Disabled
>4GByte Addressing	Enabled, Disabled	Disabled
Luns per Target	0, 8, 16, 32, 64, 128, 256	8
Enable LIP Reset	Yes, No	No
Enable LIP Full Login	Yes, No	Yes
Enable Target Reset	Yes, No	Yes
Login Retry Count	0–255	8
Port Down Retry Count	0–255	30
Drivers Load RISC Code	Enabled, Disabled	Enabled
Enable Database Updates	Yes, No	No

**Table 2-2. Advanced Adapter Settings (Continued)**

Setting	Options	Default
Disable Database Load	Yes, No	No
IOCB Allocation	1–512 buffers	256 buffers
Extended Error Logging	Enabled, Disabled	Disabled

- **Execution Throttle.** This setting specifies the maximum number of commands executing on any one port. When a port’s execution throttle is reached, no new commands are executed until the current command finishes executing. The valid options for this setting are 1–256. The default is 16.
- **Fast Command Posting.** This setting decreases command execution time by minimizing the number of interrupts. The default is Disabled.
- **>4GByte Addressing.** This option should be Enabled if the system has more than 4 GB of memory available. The default is Disabled.
- **LUNs per Target.** This setting specifies the number of LUNs per target. Multiple LUN support is typically for RAID boxes that use LUNs to map drives. The default is 8. If you do not need multiple LUN support, set the number of LUNs to 0.
- **Enable LIP Reset.** This setting determines the type of loop initialization process (LIP) reset that is used when the operating system initiates a bus reset routine. When this setting is Yes, the driver initiates a global LIP reset to clear the target device reservations. When this setting is No, the driver initiates a global LIP reset with full login. The default is No.
- **Enable LIP Full Login.** This setting instructs the ISP chip to re-login to all ports after any LIP. The default is Yes.
- **Enable Target Reset.** This setting enables the drivers to issue a Target Reset command to all devices on the loop when a SCSI Bus Reset command is issued. The default is Yes.
- **Login Retry Count.** This setting specifies the number of times the software tries to log in to a device. The default is 8 retries.
- **Port Down Retry Count.** This setting specifies the number of times the software retries a command to a port returning port down status. The default is 30 retries.
- **Drivers Load RISC Code.** When this setting is Enabled, the QLA2340/2340L HBA uses the RISC firmware that is embedded in the software driver. When this setting is Disabled, the software driver loads the RISC firmware that is stored in the QLA2340/2340L HBA BIOS. The default is Enabled.

**NOTE:** The driver being loaded must support this setting. If the driver does not support this setting, the result is the same as Disabled regardless of the setting. Leaving this option enabled guaranties a certified combination of software driver and RISC firmware.

- **Enable Database Updates.** When enabled, this setting allows the software to save the loop configuration information in flash memory when the system powers down. The default is No.
- **Disable Database Load.** When enabled, the device database is read from the Registry during driver initialization. When disabled, the device database is created dynamically during driver initialization. The default is No.

**NOTE:** This option usually applies to the Windows NT and Windows 2000 operating environments.

- **IOCB Allocation.** This setting specifies the maximum number of buffers from the firmware’s buffer pool that are allocated to any one port. The default is 256 buffers.
- **Extended Error Logging.** This setting provides additional error and debug information to the operating system. When Enabled, events are logged into the Windows NT/Windows 2000 Event Viewer. The default is Disabled.

### 2.3.2.6

## Extended Firmware Settings

From the **Configuration Settings** menu in *Fast!UTIL*, select **Extended Firmware Settings**. The default settings for the QLA2340/2340L HBA are listed in [table 2-3](#) and described in the following paragraphs.

**Table 2-3. Extended Firmware Settings**

Setting	Options	Default
<b>Extended Control Block</b>	Enabled, Disabled	Enabled
<b>RIO Operation Mode</b>	0, 1, 2, 3, 4	0
<b>Connection Options</b>	0, 1, 2	2
<b>Class 2 Service</b>	Enabled, Disabled	Disabled
<b>ACK0</b>	Enabled, Disabled	Disabled
<b>Fibre Channel Tape Support</b>	Enabled, Disabled	Enabled
<b>Fibre Channel Confirm</b>	Enabled, Disabled	Enabled
<b>Command Reference Number</b>	Enabled, Disabled	Disabled
<b>Read Transfer Ready</b>	Enabled, Disabled	Disabled
<b>Response Timer</b>	0–255	0

**Table 2-3. Extended Firmware Settings (Continued)**

Setting	Options	Default
Interrupt Delay Timer	0–255	0
Data Rate	0, 1, 2	2

- **Extended Control Block.** This setting enables all other extended firmware settings. The default is Enabled.
- **RIO Operation Mode.** This setting specifies the reduced interrupt operation (RIO) modes, if supported by the software driver. RIO modes allow posting multiple command completions in a single interrupt (see table 2-4). The default is 0.

**Table 2-4. RIO Operation Modes**

Option	Operation Mode
0	No multiple responses
1	Multiple responses, 16-bit handles, interrupt host
2	Multiple responses, 32-bit handles, interrupt host
3	Multiple responses, 16-bit handles, delay host interrupt
4	Multiple responses, 32-bit handles, delay host interrupt

- **Connection Options.** This setting defines the type of connection (loop or point-to-point) or connection preference (see table 2-5). The default is 2.

**Table 2-5. Connection Options**

Option	Type of Connection
0	Loop only
1	Point-to-point only
2	Loop preferred, otherwise point-to-point

- **Class 2 Service.** This setting enables Class 2 service parameters to be provided during all automatic logins (loop ports). The default is Disabled.
- **ACK0.** This setting determines the type of ACK used. When this setting is Enabled, sequence ACK is used. When this setting is Disabled, frame ACK is used. The default is Disabled.

**NOTE:** The Class 2 Service setting must be Enabled to use the ACK0 setting.

- **Fibre Channel Tape Support.** This setting enables FCP-2 recovery. The default is Enabled.

- **Fibre Channel Confirm.** This setting enables the host to send the FCP confirmation frame when requested by the target. The default is Enabled. This setting must be Enabled if the Fibre Channel Tape Support setting is Enabled.
- **Command Reference Number.** This setting is reserved. The default is Disabled.
- **Read Transfer Ready.** This setting is reserved. The default is Disabled.
- **Response Timer.** This setting contains the value (in 100-microsecond increments) used by a timer to limit the time waiting accumulating multiple responses. For example, if this field is 8, the time limit is 800 microseconds. The default is 0.
- **Interrupt Delay Timer.** This setting contains the value (in 100-microsecond increments) used by a timer to set the wait time between accessing (DMA) a set of handles and generating an interrupt. The default is 0.
- **Data Rate.** This setting determines the data rate. When this setting is 1, the QLA2340/2340L HBA runs at 2 Gbps. When this setting is 2, *Fast!UTIL* determines what rate your system can accommodate and sets the rate accordingly. The default is 2.

### 2.3.3

## Scan Fibre Channel Devices

This option scans the FC loop and lists all the connected devices by loop ID. Information about each device is listed, for example, vendor name, product name, and revision. This information is useful when configuring your QLA2340/2340L HBA and attached devices.

### 2.3.4

## Fibre Disk Utility

This option scans the FC loop and lists all the connected devices by loop ID. You can select a hard disk and perform a low-level format or verify the hard disk.

**CAUTION!** Performing a low-level format destroys all data on the hard disk.

### 2.3.5

## Select Host Adapter

If you have multiple QLA2340/2340L HBAs in your system, use this setting to select and then configure or view the settings of a specific QLA2340/2340L HBA.

## 2.4 FCode

This section provides instructions for installing FCode on a QLA2340/2340L HBA installed in a Solaris SPARC system. A QLA2340/2340L HBA with FCode loaded in its flash ROM provides boot capability to its attached devices.

The following files are included. Be sure to review the Readme.txt file for both new and changed information.

- ifp2312.prom—FCode code binary file
- readme.txt—FCode readme file
- qla2x00flash—Solaris flash utility
- readme—readme for qla2x00flash

The procedure for installing FCode flash is summarized in the following steps and explained in detail in the following sections.

1. Flash the QLA2340/2340L HBA with FCode ([see section 2.4.1](#)).
2. Set the QLA2340/2340L HBA connection mode ([see section 2.4.2](#)).
3. Set the QLA2340/2340L HBA loop ID ([see section 2.4.3](#)).
4. Select the boot device ([see section 2.4.5](#)).
5. Build the bootable disk ([see section 2.4.6](#)).

### 2.4.1 Flashing a QLA2340/2340L HBA with FCode

Flash the QLA2340/2340L HBA with FCode if you want to update the existing FCode on the QLA2340/2340L HBA. A QLogic Solaris SPARC driver revision 3.06 or later must be installed before the flash utility can be run.

**WARNING!!** Be careful when changing flash contents; incorrect data may render the QLA2340/2340L HBA unusable to the point that the operating system may not function.

Perform the following steps to run the flash utility:

1. Copy the qla2x00flash file and the ifp2312.prom file to the desired directory.
2. At the command line, enter the appropriate path. Use the information obtained with the **show-devs** command (see [step 1 in section 2.4.5](#)). For example:

```
./qla2x00flash -l /devices/pci@1f,0/pci@1/QLGC,qla@4:  
devctl ifp2312.prom
```



## 2.4.2

### Setting the QLA2340/2340L HBA Connection Mode

Perform the following steps to view the current QLA2340/2340L HBA connection mode and change it if necessary.

**NOTE:** Due to possible equipment incompatibility, QLogic does not recommend selecting connection mode 3.

1. Select the QLA2340/2340L HBA attached to the Fibre Channel device from which you want to boot. For example, type the following at the ok prompt:

```
ok " /pci@1f,0/pci@1/QLGC,qla@4" select-dev
```

2. To view the current connection mode, type the **show-connection-mode** command:

```
ok show-connection-mode
```

The connection mode and options display. For example:

```
Current HBA connection mode: 3 - Point-to-point
preferred, otherwise loop
```

```
Possible connection mode choices:
```

```
0 - Loop Only
```

```
1 - Point-to-point only
```

```
2 - Loop preferred, otherwise point-to-point
```

3. If the connection mode is not correct based on the devices connected to the QLA2340/2340L HBA, change it using the **set-connection-mode** command. For example:

```
ok 0 set-connection-mode
```

The new connection mode displays. For example:

```
Calculating NVRAM checksum, please wait...
```

```
Current HBA connection mode: 0 - Loop Only
```

```
Possible connection mode choices:
```

```
0 - Loop Only
```

```
1 - Point-to-point only
```

```
2 - Loop preferred, otherwise point-to-point
```

### 2.4.3

## Setting the QLA2340/2340L HBA Loop ID

When the QLA2340/2340L HBA is currently operating in loop mode (through connection mode 0 or connection mode 2), perform the following steps to view its loop ID and change it if necessary:

1. Select the QLA2340/2340L HBA attached to the Fibre Channel device from which you want to boot. For example, type the following at the ok prompt:

```
ok " /pci@1f,0/pci@1/QLGC,qla@4" select-dev
```

2. To view the loop ID, type the **show-adapter-loopid** command.

```
ok show-adapter-loopid
```

The loop ID displays. For example:

```
Adapter loopid - 7c
```

3. If the loop ID is not correct, change it using the **set-adapter-loopid** command. For example:

```
ok 0 set-adapter-loopid
```

The new loop ID displays. For example:

```
Adapter loopid - 0
```

### 2.4.4

## Setting and Viewing the Fibre Channel Data Rate

Use the show-data-rate command to view the current QLA2340/2340L Fibre Channel data rate. For example:

1. Select the QLA2340/2340L HBA attached to the Fibre Channel device from which you want to boot. For example, type the following at the ok prompt:

```
ok " /pci@1f,0/pci@1/QLGC,qla@4" select-dev
```

2. Type the following:

```
ok show-data-rate
```

3. The current data rate displays. For example:

```
Current HBA data rate: One Gigabit rate
```

Use the `set-data-rate` command to change the current QLA2340/2340L Fibre Channel data rate. For example:

```
ok 1 set-data-rate
Calculating NVRAM checksum, please wait...
Current HBA data rate: Two Gigabit rate
```

[Table 2-6](#) lists the values to enter and their corresponding data rates. QLogic recommends the Auto-negotiated rate (2), which works for most devices.

**Table 2-6. Fibre Channel Data Rates**

Value	Data Rate
0	One gigabit
1	Two gigabits
2	Auto-negotiated rate

## 2.4.5 Selecting the Boot Device

Perform the following steps to select a Fibre Channel device that is attached to the QLA2340/2340L HBA as the boot device:

1. Use the **show-devs** command to display the device tree for all devices attached to the machine.

```
ok show-devs
```

The device tree displays. The QLA2340/2340L HBAs with FCode are referenced with `QLGC,qla@`. For example:

```
ok show-devs
:
:
/pci@1f,0/pci@1/QLGC,qla@4
```

2. Select the QLA2340/2340L HBA attached to the Fibre Channel device from which you want to boot. For example, type the following at the ok prompt:

```
ok " /pci@1f,0/pci@1/QLGC,qla@4" select-dev
```

3. Use the **show-children** command to view the devices attached to the QLA2340/2340L HBA. For example:

```
ok show-children
```

4. The list of devices displays. Write down the boot device's world wide name (WWN), loop ID, and logical unit number (LUN).
5. Save the boot device information to the QLA2340/2340L HBA's NVRAM. Use the **set-boot-id** command. Include the selected QLA2340/2340L HBA's WWN, loop ID, and LUN. For example:

```
ok 2200002037009eeb 82 0 set-boot-id
```

The following displays:

```
Calculating NVRAM checksum, please wait.... done
Boot device login successful
Boot WWN - 20000020 37009eeb WWPN - 22000020 37009eeb
  Id - 82 Lun - 0
ok
```

6. To boot the QLA2340/2340L HBA, type the complete boot path, including the loop ID and LUN. The loop ID and LUN must match those entered in [step 5](#). For example:

```
ok boot /pci@1f,0/pci@1/QLGC,q1a@4/sd@82,0
```

**NOTE:** Enter the **reset** command before attempting to boot if the boot was interrupted or any of the QLogic FCode commands were executed.

## 2.4.6 Building the Bootable Disk

This procedure assumes that the system is already booted from an existing system hard disk, and that you have already performed a full system backup.

The device path on each system differs, depending on the PCI bus slot, target ID, LUN, etc. The device name shown in this example is for a device on the third PCI bus slot, target ID 130, LUN 0, slice 0.

You must have already completed the steps in the previous sections before attempting to create a bootable disk.

To build a bootable disk, perform the following steps:

1. Determine the amount of disk space used/available on your current boot disk. Use the **df** command for a listing. For example:

```
/usr/bin/df -k -l
```

Filesystem	kbytes	used	avail	capacity	Mounted on
/dev/dsk/c0t0d0s0	2577118	1650245	875331	66%	/
/proc	0	0	0	0%	/proc
fd	0	0	0	0%	/dev/fd
mnttab	0	0	0	0%	/etc/mnttab
swap	1310480	0	1310480	0%	/var/run
swap	1311344	864	1310480	1%	/tmp
/dev/dsk/c0t0d0s7	5135326	114	5083859	1%	/home

This df example shows that the current boot disk is /dev/dsk/c0t0d0s(x). There are two partitions of interest, slice 0 (/) and slice 7 (/home). Slice 0 uses 1.65 GB and has 875 MB free. Slice 7 uses 114 MB and has 5 GB free. Therefore, slice 7 (/home) contains enough disk space to store the temporary saveset files.

If there were not at least 1.7 GB free on this disk, you would need to create a partition on the new bootable disk large enough to hold the largest temporary saveset files plus the largest used space on a partition. In this example, it would be a 3.2 GB (1.6 GB+1.6 GB) partition.

2. Use the **format** command to create, label, and format partitions on the new bootable disk. These partitions must be able to contain the contents of your temporary saveset files. If you are not familiar with the **format** command, refer to the Solaris documentation .

**WARNING!!** Misusing the **format** command can destroy the data on your current disk drives.

- a. At the root prompt, type `format`.
- b. A list of available hard disks displays. Specify the disk.
- c. At the format prompt, type `partition`.
- d. At the partition prompt, type `print`. The partition table displays, as in the following example.

Part	Tag	Flag	Cylinders	Size	Blocks
0	root	wm	0 - 8738	4.00GB	(8739/0/0) 8389440
1	swap	wu	8739 - 9188	210.94MB	(450/0/0) 432000
2	backup	wu	0 - 9201	4.21GB	(9202/0/0) 8833920
3	unassigned	wm	0	0 (0/0/0)	0
4	unassigned	wm	0	0 (0/0/0)	0
5	unassigned	wm	0	0 (0/0/0)	0
6	unassigned	wm	0	0 (0/0/0)	0
7	unassigned	wm	0	0 (0/0/0)	0

- e. At the partition prompt, type `label`. Enter the label.
  - f. At the label prompt, type `quit`.
  - g. Type `quit` until the system prompt displays.
3. To create the file system, use the **newfs** command. For example:

```
newfs -v /dev/rdisk/c3t130d0s0
```

**NOTE:** The target device ID (t130) is in decimal. The hexadecimal value for the target ID is used in the boot command line shown in [step 11](#).

4. Mount the boot partition to the `/mnt` mount point. For example:

```
mount /dev/dsk/c3t130d0s0 /mnt
```

5. Change to the root partition mount point directory. For example:

```
cd /mnt
```

6. Use the **ufsdump** utility to copy the root partition to the new boot disk. For example:

```
ufsdump 0f - / | ufsrestore rf -
```

7. Use the **rm** command to delete the restoresymtable file:

```
rm restoresymtable
```

8. Install the boot block on the new boot disk. For example:

```
installboot /usr/platform/'uname -i'  
/lib/fs/ufs/bootblk /dev/rdisk/c3t130d0s0
```

**NOTE:** Platform-specific information ('uname -i') varies depending on the hardware platform.

9. Edit the new vfstab file to properly mount the new partitions during boot. In this case, each reference to c0t0d0s0 is changed to c3t130d0s0. For example:

```
vi /mnt/etc/vfstab
```

10. Shut down the system. Type the following:

```
/sbin/init 0
```

11. Boot from the newly created boot disk. For example:

```
boot /pci@1f,0/pci@1/QLGC,qla@4/sd@82,0
```

**NOTE:** The target device ID (sd@82) is in hexadecimal. The decimal value is used in [step 3](#).

12. View the current dump device setting. For example:

```
# dumpadm  
Dump content: kernel pages  
Dump device: /dev/dsk/c0t0d0s1 (swap)  
Savecore directory: /var/crash/saturn  
Savecore enabled: yes
```

13. Change the dump device to the swap area of the new boot drive. For example:

```
# dumpadm -d /dev/dsk/c3t130d0s1
```

**NOTE:** Steps [14](#) and [15](#) set the newly created boot disk as the default boot disk. These steps are performed at the system OBP (ok) prompt.

14. Create an alias entry for the new boot device (optional). For example:

```
ok nvalias fibredisk
/pci@1f,0/pci@1/QLGC,qla@4/sd@82,0
```

15. Set default boot device to be the new boot device (optional). For example:

```
ok setenv boot-disk fibredisk
```

## 2.5

### Specifications

Tables 2-7 and 2-8 define the QLA2340/2340L specifications.

**Table 2-7. QLA2340/2340L HBA Operating Environment**

Environment	Minimum	Maximum
Operating temperature	0°C/32°F	55°C/131°F
Storage temperature	-20 °C/-4 °F	70°C/158°F
Relative humidity (noncondensing)	10%	90%
Storage humidity (noncondensing)	5%	95%

**Table 2-8. QLA2340/2340L HBA Specifications**

Type	Specification
Host bus	Conforms to <i>PCI Local Bus Specification</i> , revision 2.2 and the <i>PCI-X Addendum</i> , revision 1.0
PCI/PCI-X signaling environment	3.3 V and 5.0 V buses supported
PCI/PCI-X transfer rate	132 MBps maximum burst rate for 32-bit PCI operation at 33 MHz 264 MBps maximum burst rate for 32-bit PCI/PCI-X operation at 66 MHz 264 MBps maximum burst rate for 64-bit PCI operation at 33 MHz 528 MBps maximum burst rate for 64-bit PCI/PCI-X operation at 66 MHz 1GBps maximum burst rate for 64-bit PCI-X operation at 133 MHz
Fibre Channel specifications	Bus type: Multimode fibre optic media Bus transfer rate: 200 MBps maximum at half-duplex 400 MBps maximum at full-duplex Interface chip: ISP2312
CPU	Single-chip design that includes a QLogic RISC processor, Fibre Channel protocol manager, PCI/PCI-X DMA controller, and integrated serializer/deserializer (SERDES) and electrical transceivers that can auto-negotiate a data rate of 1 Gbps or 2 Gbps
RAM	256 KB of sync SRAM supporting parity protection
BIOS ROM	128 KB of flash ROM in two 64-KB, software selectable banks. The flash is field programmable.

**Table 2-8. QLA2340/2340L HBA Specifications (Continued)**

Type	Specification
NVRAM	256 bytes, field programmable
Onboard DMA	Five-channel DMA controller: two data, one command, one auto-DMA request, and one auto-DMA response
Frame buffer FIFO	Integrated 4-KB transmit and 6-KB receive frame buffer FIFO for each data channel
Connectors	LC-style connector that supports non-OFC, multimode fibre optic cabling using a small form factor optical transceiver module
Form factor	16.93 cm×5.15 cm (6.7"×2.5")
Operating power	Less than 15 watts

## 2.6 Label

The transceiver on the QLA2340/2340L HBA is a Class I laser product. It complies with IEC 825-1 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated under recommended operating conditions.



## 2.7 Agency Certification

The following sections contains a summary of the EMC/EMI test specifications performed on the QLA2340/2340L (FC5010409-xx) to comply with radiated emission, radiated immunity and product safety standards.

### 2.7.1 EMI and EMC Requirements

The QLA2340/2340L conform to the following requirements:

- FCC Part 15, Class B
  - EN 50081-1
    - Radiated Emission                      Class B
    - Conducted Emission                      Class B
  
- ICES-003 Class B



- CE Mark 89/336/EEC EMC Directive
  - EN55022:1998/CISPR22:1997
    - Radiated Emission Class B
    - Conducted Emission Class B
  - EN55024:1998
    - Immunity Standards ESD
    - EN61000-4-2 :1995 RF Electro Magnetic Field
    - EN61000-4-3 :1995 Fast Transient/Burst
    - EN61000-4-4 :1995 Fast Surge Common/Differential
    - EN61000-4-5 :1995 RF Conducted Susceptibility
    - EN61000-4-6 :1996 Power Frequency Magnetic Field
    - EN61000-4-8 : 1994 Voltage Dips and Interrupt
    - EN61000-4-11: 1994 Harmonic Current Emission
    - EN61000-3-2:1995 Voltage Fluctuation and Flicker
- VCCI, Class B
- CNS 13438 Class B
- AS/NZS 3548 Class B

## 2.7.2

### Product Safety Requirements

- UL, cUL
  - UL60950
  - CSA C22.2 No.60950
- 73/23/EEC Low Voltage Directive
  - TUV:
    - EN60950:1992+A1,2,3,4,11
    - EN60825-1:1994+A1 I
    - EN60825-2:1994



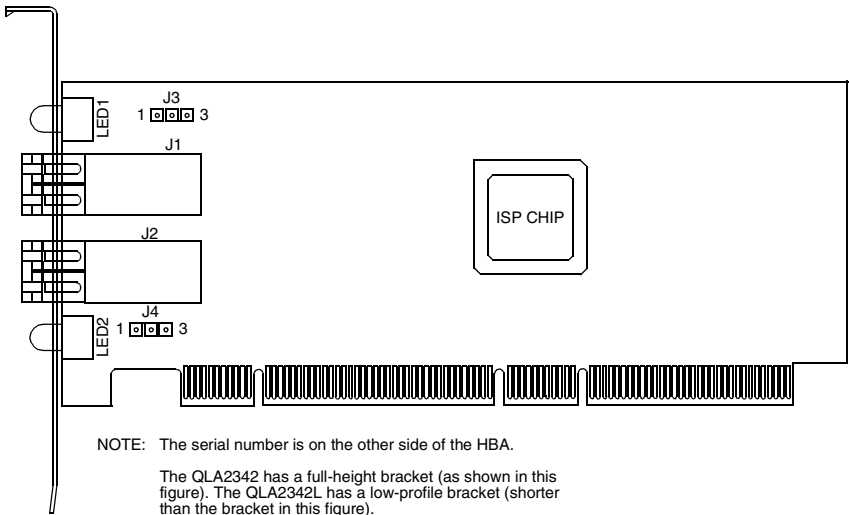
# Section 3

## QLA2342/2342L

### 3.1 QLA2342/2342L HBA Components

Figure 3-1 identifies the QLA2342/2342L HBA components referenced throughout this section.

Each QLA2342/2342L HBA has a unique serial number; its location on the HBA is noted in figure 3-1. Take a minute to write down the serial number of the QLA2342/2342L HBA.



**Figure 3-1. QLA2342/2342L HBA Layout**

### 3.1.1 LEDs

Figure 3-2 identifies and describes the activity of the QLA2342/2342L HBA LEDs.

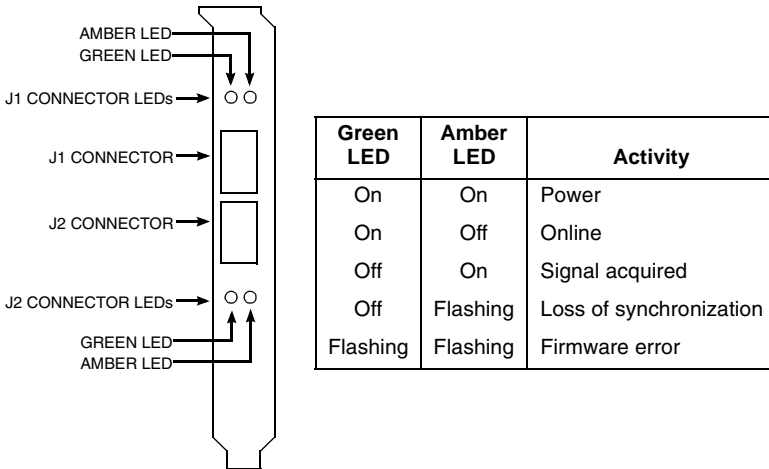


Figure 3-2. QLA2342/2342L HBA LED Activity

### 3.1.2 Jumpers

The jumpers on the QLA2342/2342L HBAs set the default state of the laser and are set at the factory with a jumper plug on pins 2–3 of the J3 and J4 jumpers.

**CAUTION!** Changing the jumper settings can result in the HBA being inoperable.

## 3.2 Installation in the Computer

Before you install the QLA2342/2342L HBA in your computer, you need the following:

- A screwdriver (usually a Phillips #1)
- Two optical multimode cables with LC-style duplex connectors

**CAUTION!** The QLA2342/2342L HBA contains parts that can be damaged by ESD. Before handling the QLA2342/2342L HBA, use standard methods to discharge static electricity. Keep the QLA2342/2342L HBA in the antistatic bag until you are ready to install it. Place the HBA on the bag when you examine or configure it. Retain the bag for future use.

Perform the following steps to install the QLA2342/2342L HBA in your PC:

1. Check the motherboard and make any configuration changes necessary to accommodate the QLA2342/2342L HBA.

The QLA2342/2342L HBA is self-configuring; however, some motherboards require manual configuration. For example, some systems have a **PCI Device Configuration** menu in the motherboard setup BIOS where you must enable HBAs, bus master slots, and IRQ levels. If the motherboard supports triggering, use *level triggering* for the QLA2342/2342L HBA. See the documentation supplied with your computer, or contact your computer dealer to determine if your motherboard requires configuration.

2. Power down the peripherals, then the computer.
3. Remove the computer cover and save the screws.
4. Choose any PCI bus slot that supports bus mastering. Most motherboards automatically assign an IRQ level and interrupt line; if your motherboard does not, you must assign the IRQ level and use *interrupt line A* for this slot.

**NOTE:**

- Some motherboards have two kinds of PCI bus slots: master and slave. The QLA2342/2342L HBA must be in a PCI bus master slot. (Some motherboards have PCI bus master slots that are shared with onboard devices. QLA2342/2342L HBAs do not work in shared slots.)
- PCI connectors vary among system HBA manufacturers. The QLA2342/2342L HBA is a 64-bit PCI device that can function in a 32-bit PCI slot; the slot conforms to the PCI specification (the rear edge of the PCI slot is notched). If you try to install the QLA2342/2342L HBA into a PCI slot that does not conform to the PCI specification, you may damage the QLA2342/2342L HBA.
- PCI and PCI-X slots look the same. If the PC contains both PCI and PCI-X slots, refer to the PC manufacturer's instructions to determine the slot type.
- The QLA2342/2342L HBAs are designed and tested to operate at PCI bus speeds of up to 133 MHz.

5. Remove the slot cover for the slot in which you will install the QLA2342/2342L HBA.
6. Place the QLA2342/2342L HBA into the slot. Carefully press the HBA into the slot until it seats firmly.
7. Secure the QLA2342/2342L HBA to the chassis. Follow the PC manufacturer's instructions.

8. Connect the appropriate cable from the devices to the corresponding connector.
9. Carefully reinstall the computer cover. Insert and tighten the computer cover screws.
10. Power up all external FC devices, then power up the PC and observe the monitor. The BIOS is disabled by default. Consequently, the devices attached to the QLA2342/2342L HBA are not identified. For example:

```
QLogic Corporation
QLA23xx PCI Fibre Channel ROM BIOS Version x.xx
Copyright (C) QLogic Corporation 2000 All rights reserved.
www.qlogic.com
```

```
Press <CNTRL-Q> for Fast!UTIL
```

```
BIOS for Adapter 0 is disabled
```

```
ROM BIOS not installed
```

**NOTE:**

- SunSPARC systems do not display the BIOS banner.
- Enable the BIOS only if the boot device is attached to the QLA2342/2342L HBA. This allows the system to boot faster.
- For further information about enabling the QLA2342/2342L HBA BIOS, [see section 3.3](#).

If the information displayed on your monitor is correct, congratulations! You have successfully installed the QLA2342/2342L HBA in your computer.

If you need FCode (Solaris SPARC systems), see [section 3.4](#) for instructions on how to install or update the FCode on the QLA2342/2342L HBA.

See the appropriate section for detailed instructions on how to install the software drivers.

If the information displayed is not correct and you have checked the QLA2342/2342L HBA's configuration, [see section 4](#) for troubleshooting information.

### 3.2.1 Installation Help

If your system has an IDE hard disk, it may be assigned device number 80, which is the boot device. If your system does not have an IDE hard disk, a parallel SCSI host bus adapter (HBA), or a RAID adapter, the first bootable FC hard disk configured (the one with the lowest ID) is assigned device number 80 and becomes the boot device. The QLA2342/2342L HBA BIOS must be enabled if the boot device is connected to the QLA2342/2342L HBA.

If you have a selectable boot BIOS and want to boot to an FC hard disk, set the motherboard BIOS parameters to None or Not Installed. The ROM BIOS on the QLA2342/2342L HBA automatically configures the FC peripherals.

Some new system BIOSs support selectable boot, which supersedes the QLA2342/2342L HBA BIOS selectable boot setting. Select the QLA2342/2342L HBA FC hard disk in the system BIOS to boot from an FC hard disk attached to the QLA2342/2342L HBA.

### 3.3 **Fast!UTIL**

**NOTE:** The *Fast!UTIL* BIOS utility does not run on SunSPARC systems. Refer to [section 3.4](#) for information regarding adapter configuration settings and for installing FCode on a QLA2342/2342L HBA in a SunSPARC system.

#### 3.3.1 **Introduction**

This appendix provides detailed configuration information for advanced users who want to customize the configuration of the QLA2342/2342L HBA and the connected devices.

The QLA2342/2342L HBA can be configured using *Fast!UTIL*, QLogic's BIOS-resident configuration tool. Access *Fast!UTIL* by pressing CNTRL+Q during the QLA2342/2342L HBA BIOS initialization (it may take a few seconds for the **Fast!UTIL Options** menu to display). If you have more than one QLA2342/2342L HBA, *Fast!UTIL* asks you to select the QLA2342/2342L HBA you want to configure. After changing the settings and exiting the utility, *Fast!UTIL* restarts your system to load the new parameters.

**CAUTION!** If the configuration settings are incorrect, your QLA2342/2342L HBA may not function properly.

The following sections describe the *Fast!UTIL* options.

#### 3.3.2 **Configuration Settings**

The first selection on the **Fast!UTIL Options** menu is **Configuration Settings**. These settings configure the FC devices and the QLA2342/2342L HBA to which they are attached.

### 3.3.2.1

## Host Adapter Settings

From the **Configuration Settings** menu in *Fast!UTIL*, select **Host Adapter Settings**. The default settings for the QLA2342/2342L HBA are listed in [table 3-1](#) and described in the following paragraphs.

**Table 3-1. Host Adapter Settings**

Setting	Options	Default
<b>Host Adapter BIOS</b>	Enabled, Disabled	Disabled
<b>Frame Size</b>	512, 1024, 2048	2048
<b>Loop Reset Delay</b>	0–60 seconds	5 seconds
<b>Adapter Hard Loop ID</b>	Enabled, Disabled	Disabled
<b>Hard Loop ID</b>	0–125	0
<b>Spin Up Delay</b>	Enabled, Disabled	Disabled

- **Host Adapter BIOS.** When this setting is Disabled, the ROM BIOS on the QLA2342/2342L HBA is disabled, freeing space in upper memory. This setting must be enabled if you are booting from an FC hard disk attached to the QLA2342/2342L HBA. The default is Disabled.
- **Frame Size.** This setting specifies the maximum frame length supported by the QLA2342/2342L HBA. The default size is 2048, which provides maximum performance for F-Port (point-to-point) connections.
- **Loop Reset Delay.** After resetting the loop, the firmware refrains from initiating any loop activity for the number of seconds specified in this setting. The default is 5 seconds.
- **Adapter Hard Loop ID.** This setting forces the adapter to attempt to use the ID specified in the Hard Loop ID setting. The default is Disabled.
- **Hard Loop ID.** If the Adapter Hard Loop ID setting is enabled, the adapter attempts to use the ID specified in this setting. The default ID is 0.
- **Spin Up Delay.** When this setting is Enabled, the BIOS waits up to 5 minutes to find the first drive. The default is Disabled.

### 3.3.2.2

## Selectable Boot Settings

The **Selectable Boot Settings** option is accessed from the **Configuration Settings** menu. If you enable this option, you can select the node name from which to boot. Once enabled, this option forces the system to boot on the selected FC hard disk, ignoring any IDE hard disks attached to your system. If you disable this option, the system looks for a boot device (as selected in the system BIOS). In disabled mode, the Boot ID and Boot LUN parameters have no effect.



Some new system BIOSs support selectable boot, which supersedes the *Fast!UTIL* selectable boot setting. To boot from an FC hard disk attached to the QLA2342/2342L HBA, select the QLA2342/2342L HBA FC hard disk on the system BIOS.

**NOTE:** This option applies only to hard disks; it does not apply to tape drives and other nondisk devices.

### 3.3.2.3 Restore Default Settings

The **Restore Defaults** option from the **Configuration Settings** menu restores the QLA2342/2342L HBA default settings.

### 3.3.2.4 Raw NVRAM Data

This option displays the adapter's NVRAM contents in hexadecimal format. This is a QLogic troubleshooting tool; you cannot modify the data.

### 3.3.2.5 Advanced Adapter Settings

From the **Configuration Settings** menu in *Fast!UTIL*, select **Advanced Adapter Settings**. The default settings for the QLA2342/2342L HBA are listed in [table 3-2](#) and described in the following paragraphs.

**Table 3-2. Advanced Adapter Settings**

Setting	Options	Default
Execution Throttle	1–256	16
Fast Command Posting	Enabled, Disabled	Disabled
>4GByte Addressing	Enabled, Disabled	Disabled
Luns per Target	0, 8, 16, 32, 64, 128, 256	8
Enable LIP Reset	Yes, No	No
Enable LIP Full Login	Yes, No	Yes
Enable Target Reset	Yes, No	Yes
Login Retry Count	0–255	8
Port Down Retry Count	0–255	30
Drivers Load RISC Code	Enabled, Disabled	Enabled
Enable Database Updates	Yes, No	No

**Table 3-2. Advanced Adapter Settings (Continued)**

Setting	Options	Default
Disable Database Load	Yes, No	No
IOCB Allocation	1–512 buffers	256 buffers
Extended Error Logging	Enabled, Disabled	Disabled

- **Execution Throttle.** This setting specifies the maximum number of commands executing on any one port. When a port’s execution throttle is reached, no new commands are executed until the current command finishes executing. The valid options for this setting are 1–256. The default is 16.
- **Fast Command Posting.** This setting decreases command execution time by minimizing the number of interrupts. The default is Disabled.
- **>4GByte Addressing.** This option should be Enabled if the system has more than 4 GB of memory available. The default is Disabled.
- **LUNs per Target.** This setting specifies the number of LUNs per target. Multiple LUN support is typically for RAID boxes that use LUNs to map drives. The default is 8. If you do not need multiple LUN support, set the number of LUNs to 0.
- **Enable LIP Reset.** This setting determines the type of loop initialization process (LIP) reset that is used when the operating system initiates a bus reset routine. When this setting is Yes, the driver initiates a global LIP reset to clear the target device reservations. When this setting is No, the driver initiates a global LIP reset with full login. The default is No.
- **Enable LIP Full Login.** This setting instructs the ISP chip to re-login to all ports after any LIP. The default is Yes.
- **Enable Target Reset.** This setting enables the drivers to issue a Target Reset command to all devices on the loop when a SCSI Bus Reset command is issued. The default is Yes.
- **Login Retry Count.** This setting specifies the number of times the software tries to log in to a device. The default is 8 retries.
- **Port Down Retry Count.** This setting specifies the number of times the software retries a command to a port returning port down status. The default is 30 retries.
- **Drivers Load RISC Code.** When this setting is Enabled, the QLA2342/2342L HBA uses the RISC firmware that is embedded in the software driver. When this setting is Disabled, the software driver loads the RISC firmware that is stored in the QLA2342/2342L HBA BIOS. The default is Enabled.

**NOTE:** The driver being loaded must support this setting. If the driver does not support this setting, the result is the same as Disabled regardless of the setting. Leaving this option enabled guaranties a certified combination of software driver and RISC firmware.

- **Enable Database Updates.** When enabled, this setting allows the software to save the loop configuration information in flash memory when the system powers down. The default is No.
- **Disable Database Load.** When enabled, the device database is read from the Registry during driver initialization. When disabled, the device database is created dynamically during driver initialization. The default is No.

**NOTE:** This option usually applies to the Windows NT and Windows 2000 operating environments.

- **IOCB Allocation.** This setting specifies the maximum number of buffers from the firmware’s buffer pool that are allocated to any one port. The default is 256 buffers.
- **Extended Error Logging.** This setting provides additional error and debug information to the operating system. When Enabled, events are logged into the Windows NT/Windows 2000 Event Viewer. The default is Disabled.

### 3.3.2.6

## Extended Firmware Settings

From the **Configuration Settings** menu in *Fast!UTIL*, select **Extended Firmware Settings**. The default settings for the QLA2342/2342L HBA are listed in [table 3-3](#) and described in the following paragraphs.

**Table 3-3. Extended Firmware Settings**

Setting	Options	Default
<b>Extended Control Block</b>	Enabled, Disabled	Enabled
<b>RIO Operation Mode</b>	0, 1, 2, 3, 4	0
<b>Connection Options</b>	0, 1, 2	2
<b>Class 2 Service</b>	Enabled, Disabled	Disabled
<b>ACK0</b>	Enabled, Disabled	Disabled
<b>Fibre Channel Tape Support</b>	Enabled, Disabled	Enabled
<b>Fibre Channel Confirm</b>	Enabled, Disabled	Enabled
<b>Command Reference Number</b>	Enabled, Disabled	Disabled
<b>Read Transfer Ready</b>	Enabled, Disabled	Disabled
<b>Response Timer</b>	0–255	0

**Table 3-3. Extended Firmware Settings (Continued)**

Setting	Options	Default
Interrupt Delay Timer	0–255	0
Data Rate	0, 1, 2	2

- **Extended Control Block.** This setting enables all other extended firmware settings. The default is Enabled.
- **RIO Operation Mode.** This setting specifies the reduced interrupt operation (RIO) modes, if supported by the software driver. RIO modes allow posting multiple command completions in a single interrupt (see table 3-4). The default is 0.

**Table 3-4. RIO Operation Modes**

Option	Operation Mode
0	No multiple responses
1	Multiple responses, 16-bit handles, interrupt host
2	Multiple responses, 32-bit handles, interrupt host
3	Multiple responses, 16-bit handles, delay host interrupt
4	Multiple responses, 32-bit handles, delay host interrupt

- **Connection Options.** This setting defines the type of connection (loop or point-to-point) or connection preference (see table 3-5). The default is 2.

**Table 3-5. Connection Options**

Option	Type of Connection
0	Loop only
1	Point-to-point only
2	Loop preferred, otherwise point-to-point

- **Class 2 Service.** This setting enables Class 2 service parameters to be provided during all automatic logins (loop ports). The default is Disabled.
- **ACK0.** This setting determines the type of ACK used. When this setting is Enabled, sequence ACK is used. When this setting is Disabled, frame ACK is used. The default is Disabled.

**NOTE:** The Class 2 Service setting must be Enabled to use the ACK0 setting.

- **Fibre Channel Tape Support.** This setting enables FCP-2 recovery. The default is Enabled.

- **Fibre Channel Confirm.** This setting enables the host to send the FCP confirmation frame when requested by the target. The default is Enabled. This setting must be Enabled if the Fibre Channel Tape Support setting is Enabled.
- **Command Reference Number.** This setting is reserved. The default is Disabled.
- **Read Transfer Ready.** This setting is reserved. The default is Disabled.
- **Response Timer.** This setting contains the value (in 100-microsecond increments) used by a timer to limit the time waiting accumulating multiple responses. For example, if this field is 8, the time limit is 800 microseconds. The default is 0.
- **Interrupt Delay Timer.** This setting contains the value (in 100-microsecond increments) used by a timer to set the wait time between accessing (DMA) a set of handles and generating an interrupt. The default is 0.
- **Data Rate.** This setting determines the data rate. When this setting is 1, the QLA2342/2342L HBA runs at 2 Gbps. When this setting is 2, *Fast!UTIL* determines what rate your system can accommodate and sets the rate accordingly. The default is 2.

### 3.3.3

## Scan Fibre Channel Devices

This option scans the FC loop and lists all the connected devices by loop ID. Information about each device is listed, for example, vendor name, product name, and revision. This information is useful when configuring your QLA2342/2342L HBA and attached devices.

### 3.3.4

## Fibre Disk Utility

This option scans the FC loop and lists all the connected devices by loop ID. You can select a hard disk and perform a low-level format or verify the hard disk.

**CAUTION!** Performing a low-level format destroys all data on the hard disk.

### 3.3.5

## Select Host Adapter

If you have multiple QLA2342/2342L HBAs in your system, use this setting to select and then configure or view the settings of a specific QLA2342/2342L HBA.

## 3.4 FCode

This section provides instructions for installing FCode on a QLA2342/2342L HBA installed in a Solaris SPARC system. A QLA2342/2342L HBA with FCode loaded in its flash ROM provides boot capability to its attached devices.

The following files are included. Be sure to review the Readme.txt file for both new and changed information.

- ifp2312.prom—FCode code binary file
- readme.txt—FCode readme file
- qla2x00flash—Solaris flash utility
- readme—readme for qla2x00flash

The procedure for installing FCode flash is summarized in the following steps and explained in detail in the following sections.

1. Flash the QLA2342/2342L HBA with FCode (see section 3.4.1).
2. Set the QLA2342/2342L HBA connection mode (see section 3.4.2).
3. Set the QLA2342/2342L HBA loop ID (see section 3.4.3).
4. Select the boot device (see section 3.4.5).
5. Build the bootable disk (see section 3.4.6).

### 3.4.1 Flashing a QLA2342/2342L HBA with FCode

Flash the QLA2342/2342L HBA with FCode if you want to update the existing FCode on the QLA2342/2342L HBA. A QLogic Solaris SPARC driver revision 3.06 or later must be installed before the flash utility can be run.

**WARNING!!** Be careful when changing flash contents; incorrect data may render the QLA2342/2342L HBA unusable to the point that the operating system may not function.

Perform the following steps to run the flash utility:

1. Copy the qla2x00flash file and the ifp2312.prom file to the desired directory.
2. At the command line, enter the appropriate path. Use the information obtained with the **show-devs** command (see step 1 in section 3.4.5). For example:

```
./qla2x00flash -l /devices/pci@1f,0/pci@1/QLGC,qla@4:  
devctl ifp2312.prom
```

### 3.4.2

## Setting the QLA2342/2342L HBA Connection Mode

Perform the following steps to view the current QLA2342/2342L HBA connection mode and change it if necessary.

**NOTE:** Due to possible equipment incompatibility, QLogic does not recommend selecting connection mode 3.

1. Select the QLA2342/2342L HBA attached to the Fibre Channel device from which you want to boot. For example, type the following at the ok prompt:

```
ok " /pci@1f,0/pci@1/QLGC,qla@4" select-dev
```

2. To view the current connection mode, type the **show-connection-mode** command:

```
ok show-connection-mode
```

The connection mode and options display. For example:

```
Current HBA connection mode: 3 - Point-to-point
preferred, otherwise loop
```

```
Possible connection mode choices:
```

```
0 - Loop Only
```

```
1 - Point-to-point only
```

```
2 - Loop preferred, otherwise point-to-point
```

3. If the connection mode is not correct based on the devices connected to the QLA2342/2342L HBA, change it using the **set-connection-mode** command. For example:

```
ok 0 set-connection-mode
```

The new connection mode displays. For example:

```
Calculating NVRAM checksum, please wait...
```

```
Current HBA connection mode: 0 - Loop Only
```

```
Possible connection mode choices:
```

```
0 - Loop Only
```

```
1 - Point-to-point only
```

```
2 - Loop preferred, otherwise point-to-point
```

### 3.4.3

## Setting the QLA2342/2342L HBA Loop ID

When the QLA2342/2342L HBA is currently operating in loop mode (through connection mode 0 or connection mode 2), perform the following steps to view its loop ID and change it if necessary:

1. Select the QLA2342/2342L HBA attached to the Fibre Channel device from which you want to boot. For example, type the following at the ok prompt:

```
ok " /pci@1f,0/pci@1/QLGC,qla@4" select-dev
```

2. To view the loop ID, type the **show-adapter-loopid** command.

```
ok show-adapter-loopid
```

The loop ID displays. For example:

```
Adapter loopid - 7c
```

3. If the loop ID is not correct, change it using the **set-adapter-loopid** command. For example:

```
ok 0 set-adapter-loopid
```

The new loop ID displays. For example:

```
Adapter loopid - 0
```

### 3.4.4

## Setting and Viewing the Fibre Channel Data Rate

Use the show-data-rate command to view the current QLA2342/2342L Fibre Channel data rate. For example:

1. Select the QLA2342/2342L HBA attached to the Fibre Channel device from which you want to boot. For example, type the following at the ok prompt:

```
ok " /pci@1f,0/pci@1/QLGC,qla@4" select-dev
```

2. Type the following:

```
ok show-data-rate
```

3. The current data rate displays. For example:

```
Current HBA data rate: One Gigabit rate
```



Use the `set-data-rate` command to change the current QLA2342/2342L Fibre Channel data rate. For example:

```
ok 1 set-data-rate
Calculating NVRAM checksum, please wait...
Current HBA data rate: Two Gigabit rate
```

[Table 3-6](#) lists the values to enter and their corresponding data rates. QLogic recommends the Auto-negotiated rate (2), which works for most devices.

**Table 3-6. Fibre Channel Data Rates**

Value	Data Rate
0	One gigabit
1	Two gigabits
2	Auto-negotiated rate

### 3.4.5 Selecting the Boot Device

Perform the following steps to select a Fibre Channel device that is attached to the QLA2342/2342L HBA as the boot device:

1. Use the **show-devs** command to display the device tree for all devices attached to the machine.

```
ok show-devs
```

The device tree displays. The QLA2342/2342L HBAs with FCode are referenced with `QLGC,qla@`. For example:

```
ok show-devs
:
:
/pci@1f,0/pci@1/QLGC,qla@4
```

2. Select the QLA2342/2342L HBA attached to the Fibre Channel device from which you want to boot. For example, type the following at the ok prompt:

```
ok " /pci@1f,0/pci@1/QLGC,qla@4" select-dev
```

3. Use the **show-children** command to view the devices attached to the QLA2342/2342L HBA. For example:

```
ok show-children
```

4. The list of devices displays. Write down the boot device's world wide name (WWN), loop ID, and logical unit number (LUN).
5. Save the boot device information to the QLA2342/2342L HBA's NVRAM. Use the **set-boot-id** command. Include the selected QLA2342/2342L HBA's WWN, loop ID, and LUN. For example:

```
ok 2200002037009eeb 82 0 set-boot-id
```

The following displays:

```
Calculating NVRAM checksum, please wait.... done
Boot device login successful
Boot WWN - 20000020 37009eeb WWPN - 22000020 37009eeb
    Id - 82 Lun - 0
ok
```

6. To boot the QLA2342/2342L HBA, type the complete boot path, including the loop ID and LUN. The loop ID and LUN must match those entered in [step 5](#). For example:

```
ok boot /pci@1f,0/pci@1/QLGC,q1a@4/sd@82,0
```

**NOTE:** Enter the **reset** command before attempting to boot if the boot was interrupted or any of the QLogic FCode commands were executed.

### 3.4.6 Building the Bootable Disk

This procedure assumes that the system is already booted from an existing system hard disk, and that you have already performed a full system backup.

The device path on each system differs, depending on the PCI bus slot, target ID, LUN, etc. The device name shown in this example is for a device on the third PCI bus slot, target ID 130, LUN 0, slice 0.

You must have already completed the steps in the previous sections before attempting to create a bootable disk.

To build a bootable disk, perform the following steps:

1. Determine the amount of disk space used/available on your current boot disk. Use the **df** command for a listing. For example:

```
/usr/bin/df -k -l
```

Filesystem	kbytes	used	avail	capacity	Mounted on
/dev/dsk/c0t0d0s0	2577118	1650245	875331	66%	/
/proc	0	0	0	0%	/proc
fd	0	0	0	0%	/dev/fd
mnttab	0	0	0	0%	/etc/mnttab
swap	1310480	0	1310480	0%	/var/run
swap	1311344	864	1310480	1%	/tmp
/dev/dsk/c0t0d0s7	5135326	114	5083859	1%	/home

This df example shows that the current boot disk is /dev/dsk/c0t0d0s(x). There are two partitions of interest, slice 0 (/) and slice 7 (/home). Slice 0 uses 1.65 GB and has 875 MB free. Slice 7 uses 114 MB and has 5 GB free. Therefore, slice 7 (/home) contains enough disk space to store the temporary saveset files.

If there were not at least 1.7 GB free on this disk, you would need to create a partition on the new bootable disk large enough to hold the largest temporary saveset files plus the largest used space on a partition. In this example, it would be a 3.2 GB (1.6 GB+1.6 GB) partition.

2. Use the **format** command to create, label, and format partitions on the new bootable disk. These partitions must be able to contain the contents of your temporary saveset files. If you are not familiar with the **format** command, refer to the Solaris documentation .

**WARNING!!** Misusing the **format** command can destroy the data on your current disk drives.

- a. At the root prompt, type `format`.
- b. A list of available hard disks displays. Specify the disk.
- c. At the format prompt, type `partition`.
- d. At the partition prompt, type `print`. The partition table displays, as in the following example.

Part	Tag	Flag	Cylinders	Size	Blocks
0	root	wm	0 - 8738	4.00GB	(8739/0/0) 8389440
1	swap	wu	8739 - 9188	210.94MB	(450/0/0) 432000
2	backup	wu	0 - 9201	4.21GB	(9202/0/0) 8833920
3	unassigned	wm	0	0 (0/0/0)	0
4	unassigned	wm	0	0 (0/0/0)	0
5	unassigned	wm	0	0 (0/0/0)	0
6	unassigned	wm	0	0 (0/0/0)	0
7	unassigned	wm	0	0 (0/0/0)	0

- e. At the partition prompt, type `label`. Enter the label.
  - f. At the label prompt, type `quit`.
  - g. Type `quit` until the system prompt displays.
3. To create the file system, use the **newfs** command. For example:

```
newfs -v /dev/rdisk/c3t130d0s0
```

**NOTE:** The target device ID (t130) is in decimal. The hexadecimal value for the target ID is used in the boot command line shown in [step 11](#).

4. Mount the boot partition to the /mnt mount point. For example:

```
mount /dev/dsk/c3t130d0s0 /mnt
```

5. Change to the root partition mount point directory. For example:

```
cd /mnt
```

6. Use the **ufsdump** utility to copy the root partition to the new boot disk. For example:

```
ufsdump 0f - / | ufsrestore rf -
```

7. Use the **rm** command to delete the restoresymtable file:

```
rm restoresymtable
```

8. Install the boot block on the new boot disk. For example:

```
installboot /usr/platform/'uname -i'  
/lib/fs/ufs/bootblk /dev/rdisk/c3t130d0s0
```

**NOTE:** Platform-specific information ('uname -i') varies depending on the hardware platform.

9. Edit the new vfstab file to properly mount the new partitions during boot. In this case, each reference to c0t0d0s0 is changed to c3t130d0s0. For example:

```
vi /mnt/etc/vfstab
```

10. Shut down the system. Type the following:

```
/sbin/init 0
```

11. Boot from the newly created boot disk. For example:

```
boot /pci@1f,0/pci@1/QLGC,qla@4/sd@82,0
```

**NOTE:** The target device ID (sd@82) is in hexadecimal. The decimal value is used in [step 3](#).

12. View the current dump device setting. For example:

```
# dumpadm  
Dump content: kernel pages  
Dump device: /dev/dsk/c0t0d0s1 (swap)  
Savecore directory: /var/crash/saturn  
Savecore enabled: yes
```

13. Change the dump device to the swap area of the new boot drive. For example:

```
# dumpadm -d /dev/dsk/c3t130d0s1
```

**NOTE:** Steps [14](#) and [15](#) set the newly created boot disk as the default boot disk. These steps are performed at the system OBP (ok) prompt.

14. Create an alias entry for the new boot device (optional). For example:

```
ok nvalias fibredisk
/pci@1f,0/pci@1/QLGC,qla@4/sd@82,0
```

15. Set default boot device to be the new boot device (optional). For example:

```
ok setenv boot-disk fibredisk
```

### 3.5

## Specifications

Tables 3-7 and 3-8 define the QLA2342/2342L specifications.

**Table 3-7. QLA2342/2342L HBA Operating Environment**

Environment	Minimum	Maximum
Operating temperature	0°C/32°F	55°C/131°F
Storage temperature	-20 °C/-4 °F	70°C/158°F
Relative humidity (noncondensing)	10%	90%
Storage humidity (noncondensing)	5%	95%

**Table 3-8. QLA2342/2342L HBA Specifications**

Type	Specification
Host bus	Conforms to <i>PCI Local Bus Specification</i> , revision 2.2 and the <i>PCI-X Addendum</i> , revision 1.0
PCI/PCI-X signaling environment	3.3 V and 5.0 V buses supported
PCI/PCI-X transfer rate	132 MBps maximum burst rate for 32-bit PCI operation at 33 MHz 264 MBps maximum burst rate for 32-bit PCI/PCI-X operation at 66 MHz 264 MBps maximum burst rate for 64-bit PCI operation at 33 MHz 528 MBps maximum burst rate for 64-bit PCI/PCI-X operation at 66 MHz 1GBps maximum burst rate for 64-bit PCI-X operation at 133 MHz
Fibre Channel specifications	Bus type: Multimode fibre optic media Bus transfer rate: 200 MBps maximum at half-duplex 400 MBps maximum at full-duplex Interface chip: ISP2312
CPU	Single-chip design that includes a QLogic RISC processor, Fibre Channel protocol manager, PCI/PCI-X DMA controller, and integrated serializer/deserializer (SERDES) and electrical transceivers that can auto-negotiate a data rate of 1 Gbps or 2 Gbps
RAM	256 KB of sync SRAM supporting parity protection
BIOS ROM	128 KB of flash ROM in two 64-KB, software selectable banks. The flash is field programmable.

**Table 3-8. QLA2342/2342L HBA Specifications (Continued)**

Type	Specification
NVRAM	256 bytes, field programmable
Onboard DMA	Five-channel DMA controller: two data, one command, one auto-DMA request, and one auto-DMA response
Frame buffer FIFO	Integrated 4-KB transmit and 6-KB receive frame buffer FIFO for each data channel
Connectors	Two LC-style connectors for multimode fibre optic cabling using a small form factor optical transceiver module
Form factor	16.93 cm×5.15 cm (6.7"×2.5")
Operating power	Less than 15 watts

### 3.6 Label

The transceiver on the QLA2340/2340L HBA is a Class I laser product. It complies with IEC 825-1 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated under recommended operating conditions.



### 3.7 Agency Certification

The following sections contains a summary of the EMC/EMI test specifications performed on the QLA2342/2342L (FC5010409-xx) to comply with radiated emission, radiated immunity and product safety standards.

#### 3.7.1 EMI and EMC Requirements

The QLA2340/2340L conform to the following requirements:

- FCC Part 15, Class B
  - EN 50081-1
    - Radiated Emission                      Class B
    - Conducted Emission                      Class B
  
- ICES-003 Class B

- CE Mark 89/336/EEC EMC Directive
  - EN55022:1998/CISPR22:1997
    - Radiated Emission Class B
    - Conducted Emission Class B
  - EN55024:1998
    - Immunity Standards ESD
    - EN61000-4-2 :1995 RF Electro Magnetic Field
    - EN61000-4-3 :1995 Fast Transient/Burst
    - EN61000-4-4 :1995 Fast Surge Common/Differential
    - EN61000-4-5 :1995 RF Conducted Susceptibility
    - EN61000-4-6 :1996 Power Frequency Magnetic Field
    - EN61000-4-8 : 1994 Voltage Dips and Interrupt
    - EN61000-4-11: 1994 Harmonic Current Emission
    - EN61000-3-2:1995 Voltage Fluctuation and Flicker
- VCCI, Class B
- CNS 13438 Class B
- AS/NZS 3548 Class B

### 3.7.2

## Product Safety Requirements

- UL, cUL
  - UL60950
  - CSA C22.2 No.60950
- 73/23/EEC Low Voltage Directive
  - TUV:
    - EN60950:1992+A1,2,3,4,11
    - EN60825-1:1994+A1 I
    - EN60825-2:1994





## Section 4

# Troubleshooting

### 4.1

#### Problems After Installation

There are three basic types of installation problems that can cause your QLA23xx HBA to function incorrectly: hardware problems, system configuration problems, and Fibre Channel problems. The following section provides itemized checklists to help you determine why your QLA23xx HBA is not functioning.

### 4.2

#### Hardware Problem Checklist

- Are all of the circuit cards installed securely in the system?
- Are all of the cables securely connected to the correct connectors? Be sure that the FC cables that attach from the QLA23xx HBA connectors to the device are connected correctly. For example, the optical transmit connector on the QLA23xx HBA must be connected to the optical receive connector on the device. Some connectors require a firm push to ensure proper seating. An easy way to check for correct seating is to switch the connectors on either the QLA23xx HBA or the device, then restart your system. If the BIOS is enabled, devices attached to the QLA23xx HBA are displayed on the screen.
- Is the QLA23xx HBA installed correctly in the PCI slot? Is it seated firmly in the slot?
- Check for interference due to nonstandard PCI connectors.
- Is the *Fast!UTIL* data rate setting correct? See the appropriate *Fast!UTIL* section for information about setting the data rate.
- Are all external peripherals properly powered up? See the appropriate *Fast!UTIL* section for information about displaying attached devices.

### 4.3

#### System Configuration Problem Checklist

All PCI-compliant and PCI-X-compliant systems automatically detect 32-bit or 64-bit HBAs and set the appropriate bus speed (for example, 33 MHz or 133 MHz). Check the motherboard for proper configuration (see the appropriate installation section for more information).

See the documentation supplied with your computer, or contact your computer dealer to determine if your motherboard requires special configuration.

## 4.4

### Fibre Channel Problem Checklist

- Were all of the FC devices powered up before you powered up the PC?
- Check that all cables are properly connected.
- Have you configured your RAID controller using the utilities provided by the manufacturer?
- Some Fibre Channel switches support zoning. Make sure that your switch is configured correctly.
- Make sure that Data Rate setting on the QLA23xx matches the target device. For example, if the QLA23xx is set to 2 Gb, set the target device to 2 Gb.
- If you are using a Raidbox, modify the following settings in *Fast!UTIL*:
  - Login Retry Count = 60
  - Port Down Retry Count = 60
  - Execution Throttle = 100

# Part II

## Software

This part of the *SANblade 2300 User's Guide* describes how to install the software drivers for the supported operating systems. See the section that corresponds to your computer's operating system:

Operating System	Section
Windows NT 4.0	5
Windows 2000	6
Windows XP	7
NetWare 4.2, 5.x, or 6.x	8
Red Hat Linux 6.2, 7.0, 7.1, 7.2	9
Solaris SPARC v2.6, 7, and 8	10

Before you install the software drivers, you need to locate and download the appropriate drivers for your operating system. The latest version of the QLA23xx drivers are located on the QLogic Web site, <http://www.qlogic.com>.

QLogic drivers are self-extracting and meant to be downloaded onto disks. The installation instructions in this guide assume that the QLogic drivers reside on disks.



# **Section 5**

## **Windows NT Driver Installation (QL2300.SYS)**

### **5.1**

#### **Introduction**

This section provides instructions for installing the Windows NT driver under the following operating system conditions:

- Initial installation of the Windows NT 4.0 operating system and the Windows NT driver
- Installation of the Windows NT driver in an already installed Windows NT 4.0 operating system
- Installing an updated Windows NT driver in an already installed Windows NT 4.0 operating system that has an older version of the driver

### **5.2**

#### **Windows NT Driver Files**

The latest version of the software drivers and documentation for Windows NT are available on the QLogic Web site. Be sure to review the Readme.txt file for both new and changed information.

### **5.3**

#### **Windows NT Installation**

To install Windows NT 4.0 on a Fibre Channel hard disk attached to a QLA23xx HBA, perform the installation procedures in [section 5.3.1](#). If Windows NT 4.0 is already loaded on your system, perform the installation procedures in [section 5.3.2](#). If Windows NT 4.0 and an older Windows NT driver are already installed on your system, perform the update procedures in [section 5.3.3](#).

### 5.3.1

## Initial Installation of Windows NT and the Windows NT Driver

Perform the following steps to install Windows NT 4.0 on a Fibre Channel hard disk attached to a QLA23xx HBA:

1. Insert the Windows NT setup disk or CD-ROM (if booting from a bootable CD-ROM drive) in an appropriate drive.
2. Restart your system.
3. When the **Windows NT Setup** screen displays, press F6 immediately to display the screen from which you can install a third-party SCSI or RAID driver.
4. Press S to specify an additional device.
5. Select **Other**, then press ENTER.
6. Insert the disk that contains the QLogic driver in an appropriate drive, then press ENTER.
7. Select **QLogic QLA2300 PCI Fibre Channel Adapter**, then press ENTER.
8. Follow the standard Windows NT installation instructions to complete the Windows NT setup.

### 5.3.2

## Installing or Updating the Windows NT Driver

Perform the following steps to add the Windows NT driver to a previously installed Windows NT 4.0 system.

**NOTE:** This procedure restores the default registry parameters for the QLA2300 Windows NT driver.

1. Click **Start**, point to **Settings**, and click **Control Panel**.
2. Double-click the **SCSI Adapters** icon, click the **Drivers** tab, then click **Add**.
3. Insert the disk that contains the QLogic driver in an appropriate drive and click **Have Disk**.
4. Type the path to the NT driver. For example:  
A: \Nt
5. Click **OK**.
6. Select the **QLogic QLA2300 PCI Fibre Channel Adapter**, then click **OK**.
7. Remove the disk, then click **Yes** to restart the computer.

### 5.3.3

## Updating the Windows NT Driver

Perform the following steps if a Windows NT driver is already installed on a Fibre Channel hard disk attached to a QLA23xx HBA and you want to install an updated version of the driver.

**NOTE:** This procedure does not modify the current registry parameters for the QLA2300 Windows NT driver.

1. Open a DOS command prompt window.
2. Change the current directory to the Windows NT driver directory. For example:

```
cd \Winnt\System32\Drivers
```

3. Make a backup copy of the old driver. You can copy the file into the same directory with a .SAV extension indicating that it is the saved file. For example:

```
copy Q12300.sys Q12300.sav
```

4. Insert the disk that contains the updated QLogic driver in an appropriate drive.
5. Copy the new driver over the old driver. For example:

```
copy A:\Nt\Q12300.sys
```

6. Remove the disk that contains the QLogic driver.
7. Restart your system to load the updated driver.

## 5.4

### QLDIRECT

The QLDIRECT driver, coupled with the QLogic Windows NT enhanced miniport driver, provides the following features:

- A highly optimized I/O path for normal read and write operations with reduced CPU utilization and increased parallelization
- Failover and failback features to reroute I/O operations to the correct path

This section provides installation instructions for the QLDIRECT driver in an already installed Windows NT 4.0 operating system. Earlier versions of this operating system are not supported.

### 5.4.1

## QLDIRECT Driver Files

Qldirect.sys requires the QI2300.sys *enhanced* miniport driver version 7.00.00 or above. The latest version of the QLDIRECT driver and QI2300.sys enhanced miniport driver for Windows NT are available on the QLogic Web site.

### 5.4.2

## QLDIRECT Installation

If QLDIRECT is not installed on your system, perform the installation procedures in [section 5.4.2.1](#). If the QLFILTER driver is installed on your system, perform the update procedures in [section 5.4.2.2](#).

#### 5.4.2.1

### Initial Installation of QLDIRECT

Perform the following steps to add the QLDIRECT driver to a previously installed Windows NT 4.0 system:

1. If necessary, install the QLA2300 Windows NT 4.0 enhanced miniport driver.
2. Insert the disk that contains the QLDIRECT driver in an appropriate drive.
3. Execute the Setup.exe installation program on the disk and follow the instructions on the screen.
4. Remove the disk that contains the QLDIRECT driver.
5. Restart your system to load the driver.

#### 5.4.2.2

### Updating to QLDIRECT from QLFILTER

The QLDIRECT driver replaces the QLogic QLFILTER driver. You must first uninstall the QLFILTER driver before installing the QLDIRECT driver.

**NOTE:** Windows NT does not always remove driver files and registry keys when uninstalling a driver. You must manually remove the Qlfilter.sys file and associated registry key to ensure that Windows NT does not load the Qldirect.sys and Qlfilter.sys drivers.

Perform the following steps to update from the QLFILTER driver to the QLDIRECT driver:

1. Manually delete the Qlfilter.sys file from the following directory. For example:

```
del C:\Winnt\System32\Drivers\Qlfilter.sys
```

2. Manually remove the QLFILTER key from the following registry location:

```
\HKEY_LOCAL_MACHINE\System\CurrentControlSet  
\Services
```



3. Insert the disk that contains the QLDIRECT driver in an appropriate drive.
4. Execute the Setup.exe installation program on the disk and follow the instructions on the screen.
5. Remove the disk that contains the QLDIRECT driver.
6. Restart your system to load the driver.

## 5.5

### QL2x00IP NDIS Network Driver Installation

Your system must meet the following requirements for the QL2x00IP network driver interface specification (NDIS) network driver to function properly:

- The QL2300 SCSI miniport driver must be installed.
- The *Fast!Util Drivers Load RISC Code* adapter parameter must be enabled (see the *Fast!UTIL* section that corresponds to your QLA23xx HBA).
- Windows NT networking software must be installed.
- All QLA22xx/QLA23xx HBAs on the network must have the same value set for the maximum transfer unit (MTU) size (IP configuration parameter).

If a QL2x00IP NDIS network driver is not installed on your system, perform the installation procedures in [section 5.5.1](#). If an older QL2x00IP network driver is already installed on your system, perform the update procedures in [section 5.5.2](#).

The following files are provided for installation:

- Oemsetup.inf—driver installation script for the Windows NT setup program
- Ql2x00ip.sys—QLogic QL2x00IP NDIS driver for Windows NT
- Ql2xipcu.exe—QLogic QL2x00IP Configuration Utility
- Release.txt—release notes for the QL2x00IP driver
- Readme.txt—readme file

#### 5.5.1

### Initial Installation of the QL2x00IP NDIS Network Driver

Perform the following steps to install the QL2x00IP NDIS network driver:

1. Click the **Start** button, point to **Settings**, then click **Control Panel**.
2. Double-click the **Network** icon, click the **Adapters** tab, then click **Add**.
3. Insert the disk that contains the QLogic driver in an appropriate drive.
4. In the **Select Network Adapter** dialog box, click **Have Disk**.
5. In the **Insert Disk** dialog box, type the path to the QL2x00IP NDIS network driver. For example:

A:\Nt\Ip

6. Click **OK**.

7. In the **Select OEM Option** dialog box, select the **QLogic QL2X00IP Network Driver**, then click **OK**.
8. In the **QLogic IP Configuration Utility** dialog box, change the IP driver configuration parameters as appropriate. See the description of these parameters in [section 5.5.3.1](#). Make sure the MTU size is set to the same value used on the other QLA22xx/QLA23xx HBAs in the network. Click **OK**.
9. Click **Close**.
10. In the **Microsoft TCP/IP Properties** dialog box, select the QLA23xx HBA you just installed, select **Specify an IP address**, then type the IP address and subnet mask for the QLA23xx HBA.

For each QLA23xx HBA on the network, the IP address must be unique and all QLA22xx/QLA23xx HBAs must use the same subnet mask. For example:

```
Adapter 1
  IP address: 10.0.0.1
  Subnet mask: 255.255.0.0

Adapter 2
  IP address: 10.0.0.2
  Subnet mask: 255.255.0.0
```

11. Click **OK**.
12. Remove the disk and click **Yes** to restart the computer.

## 5.5.2 Updating the QL2x00IP NDIS Network Driver

Perform the following steps if a QL2x00IP NDIS network driver is already installed and you want to install an updated version of the driver:

1. Open a DOS command prompt window.
2. Change the current directory to the Windows NT driver directory. For example:

```
cd \Winnt\System32\Drivers
```

3. Make a backup copy of the old driver. You can copy the file into the same directory with a .SAV extension indicating that it is the saved file. For example:

```
copy ql2x00ip.sys ql2x00ip.sav
```

4. Insert the disk that contains the updated QLogic driver in an appropriate drive.
5. Copy the new driver over the old driver. For example:

```
copy A:\Nt\Ip\ql2x00ip.sys
```

6. Remove the disk that contains the QLogic driver.
7. Restart your system to load the updated driver.

### 5.5.3

## QL2x00IP NDIS Driver and IP Address Configuration

You must configure the IP address and modify the driver parameters during the initial configuration as specified in [section 5.5.1](#). You can also modify these later as appropriate using the following procedures.

### 5.5.3.1

## Driver Configuration

The QL2x00IP NDIS driver provides configuration parameters. The driver configuration parameters are listed in [table 5-1](#) and described in the following paragraphs.

**Table 5-1. QL2x00ip.sys Configuration Parameters**

Parameter	Minimum	Maximum	Recommended Default
MTU Size	92	65280	8192
Buffer Count	8	128	32
Buffer Size	512	65536	4096
Header Split Size	24	Buffer size - 1	0 <sup>a</sup>
Adapter Node Name	—	—	—

Table Notes

<sup>a</sup>A value of 0 indicates that the headers and data are not split.

- **MTU Size.** This parameter specifies the maximum transfer or packet size that the host system sends or receives. All QLA22xx/QLA23xx HBAs on the same network must have the same MTU size value. QLogic recommends a default value of 8192.
- **Buffer Count.** This parameter specifies the number of receive buffers that the QL2x00IP driver allocates during initialization. The number of buffers multiplied by the buffer size must be greater than or equal to the MTU size. QLogic recommends a default value of 32.
- **Buffer Size.** This parameter specifies the size of each receive buffer. The buffer size multiplied by the number of buffers must be greater than or equal to the MTU size. Incoming packets cannot be broken into more than 23 buffers. Therefore, the buffer size multiplied by 23 must be at least as large as the MTU size. QLogic recommends a default value of 4096.

- **Header Split Size.** This parameter accounts for packets with split headers and data. The parameter value specifies the number of bytes at the beginning of an incoming packet that must be isolated in the first receive buffer. A value of 0 indicates that the packet header and data are not split. QLogic recommends a default value of 0.
- **Adapter Node Name.** This parameter specifies the world wide name (node name) of the QLA23xx HBA to use for this IP connection. The parameter is required on systems with more than one QLA23xx HBA. You can use *Fast!UTIL* to determine the node names for all QLA22xx/QLA23xx HBAs in the system (see the *Fast!UTIL* section that corresponds to your QLA23xx HBA).

Perform the following steps to modify the QL2x001P NDIS driver configuration:

1. Click the **Start** button, point to **Settings**, and click **Control Panel**.
2. Double-click the **Network** icon, click the **Adapters** tab, select the **QLogic QL2X001P Network Driver**, then click **Properties**.
3. Make configuration parameter modifications as necessary.
4. Click **OK**. The **Network** dialog box redisplay.
5. Click **Close**.
6. Click **Yes** to restart the computer.

### 5.5.3.2 IP Address Configuration

Perform the following steps to modify the IP address:

1. Click the **Start** button, point to **Settings**, and click **Control Panel**.
2. Double-click the **Network** icon, click the **Protocols** tab, select the **TCP/IP Protocol**, then click **Properties**.
3. On the **IP Address** tab, select the QLA23xx HBA, then modify the IP address and subnet mask as appropriate. Each IP address must be unique and all QLA22xx/QLA23xx HBAs on the loop must use the same subnet mask. For example:

```
Adapter 1
  IP address: 10.0.0.1
  Subnet mask: 255.255.0.0
```

```
Adapter 2
  IP address: 10.0.0.2
  Subnet mask: 255.255.0.0
```

4. Click **OK**. The **Network** dialog box redisplay.

5. Click **Close**.
6. Click **Yes** to restart the computer.

#### 5.5.4

### Removing the QL2x00IP NDIS Driver

If you need to remove the QLA2x00IP NDIS driver, perform the following steps:

1. Click the **Start** button, point to **Settings**, and then click **Control Panel**.
2. Double-click the **Network** icon, click the **Adapters** tab, select the QLA23xx HBA to be removed, and click **Remove**.
3. When the warning displays, click **Yes** to remove the driver.
4. The **Network** dialog box redisplay. Click **Close**.
5. Click **Yes** to restart the computer.



## **Section 6**

# **Windows 2000 Driver Installation (QL2300.SYS)**

### **6.1**

#### **Introduction**

This section provides instructions for installing the Windows 2000 driver under the following operating system conditions:

- Initial installation of the Windows 2000 operating system and the Windows 2000 driver
- Installation of the Windows 2000 driver in an already installed Windows 2000 operating system
- Installing an updated Windows 2000 driver in an already installed Windows 2000 operating system that has an older version of the driver

### **6.2**

#### **Creating the Driver Disk**

Follow these steps to create driver disk containing the files needed to install the Windows XP driver:

1. Locate the driver you want on the QLogic web site (<http://www.qlogic.com>) and click **Link to driver**.
2. If prompted **What would you like to do with this file?**, choose **Save this program to disk**. Specify a temporary location on the hard drive and download the driver.
3. Insert a blank disk in drive A.
4. Run the self-extracting file you just downloaded, specifying **A:\** for **Unzip To Folder**.

### **6.3**

#### **Windows 2000 Installation**

To install Windows 2000 on your system, perform the installation procedures in [section 6.3.1](#). If Windows 2000 is already loaded on your system, perform the installation procedures in [section 6.3.2](#). If Windows 2000 and an older Windows 2000 driver are already installed on your system, perform the update procedures in [section 6.3.3](#).

### 6.3.1

## Initial Installation of Windows 2000 and the Windows 2000 Driver

Perform the following steps to install Windows 2000 on a Fibre Channel hard disk attached to the QLA23xx HBA:

1. Insert the Windows 2000 setup disk or CD-ROM (if booting from a bootable CD-ROM drive) in an appropriate drive.
2. Restart your system.
3. Follow the standard Windows 2000 installation instructions.
4. When prompted from the **Windows 2000 Setup** screen, press F6 to display the screen from which you can install a third-party SCSI or RAID driver.
5. Press S to specify an additional device.
6. Insert the disk that contains the QLogic driver in an appropriate drive, then press ENTER.
7. Windows 2000 detects the QLA23xx HBA. Press ENTER to continue the driver installation.
8. Press ENTER to continue the Windows 2000 installation.
9. Follow the instructions on the screen to complete the Windows 2000 installation.

### 6.3.2

## Installing the Windows 2000 Driver

The QLA23xx HBAs are plug-and-play devices that are automatically detected by Windows 2000. Perform the following steps to add the Windows 2000 driver to a previously installed Windows 2000 system:

1. Install the QLA23xx HBA.
2. Power up the computer. Windows 2000 detects the QLA23xx and starts the **Found New Hardware Wizard**.
3. Click **Next**.
4. Select **Search for a suitable driver for my device (recommended)**. Click **Next**.
5. Insert the disk that contains the QLogic driver in an appropriate drive.
6. Select **Floppy disk drives** to specify the location of the driver files. Click **Next**.
7. The search result displays **drive:\w2kloemsetup.inf**. Click **Next**.
8. If the **Digital Signature Not Found** dialog box displays, click **Yes**.



9. Click **Finish**.
10. Remove the disk that contains the QLogic driver from the drive, then click **Yes** to restart the system.

### 6.3.3 Updating the Windows 2000 Driver

Perform the following steps if a Windows 2000 driver is already installed and you want to install an updated version of the driver.

**NOTE:** The latest versions of the software drivers and documentation are available on the QLogic Web site, <http://www.qlogic.com>.

1. Click the **Start** button, point to **Programs**, point to **Administrative Tools**, point to **Computer Management**, and then click **Device Manager**.
2. Double-click the **SCSI and RAID controllers** icon.
3. Double-click the **QLogic QLA2300 PCI Fibre Channel Adapter** icon, click the **Drivers** tab, and then click **Update Driver**.
4. The **Upgrade Device Driver Wizard** dialog box displays. Click **Next**.
5. Select **Display a list of the known device drivers for this device so that I can choose a specific driver**. Click **Next**.
6. Click **Have Disk**. The **Install From Disk** dialog box displays.
7. Insert the disk that contains the QLogic driver in an appropriate drive, then type the location of the Windows 2000 driver. For example:  

```
A : \w2k
```
8. Click **OK**.
9. Select **QLogic QLA23xx PCI Fibre Channel Adapter**, then click **Next**. Windows 2000 indicates that the wizard is ready to install the device.
10. Click **Next**.
11. If the **Digital Signature Not Found** dialog box displays, click **Yes**.
12. Click **Finish**.
13. Remove the disk that contains the QLogic driver from the drive, then click **Yes** to restart the system.

## 6.4 QLDIRECT

The QLDIRECT driver, coupled with the QLogic Windows 2000 enhanced miniport driver, provides the following features:

- A highly optimized I/O path for normal read and write operations with reduced CPU utilization and increased parallelization
- Failover and fallback features to reroute I/O operations to the correct path

This section provides installation instructions for the QLDIRECT driver in an already installed Windows 2000 operating system. Earlier versions of this operating system are not supported.

### 6.4.1 QLDIRECT Driver Files

Qldirect.sys requires the QI2300.sys *enhanced* miniport driver version 7.00.00 or above. The latest version of the QLDIRECT driver and QI2300.sys enhanced miniport driver for Windows 2000 are available on the QLogic Web site.

### 6.4.2 QLDIRECT Installation

If QLDIRECT is not installed on your system, perform the installation procedures in [section 6.4.2.1](#). If the QLFILTER driver is installed on your system, perform the update procedures in [section 6.4.2.2](#).

#### 6.4.2.1 Initial Installation of QLDIRECT

Perform the following steps to add the QLDIRECT driver to a previously installed Windows 2000 system:

1. If necessary, install the QLA2300 Windows 2000 enhanced miniport driver.
2. Insert the disk that contains the QLDIRECT driver in an appropriate drive.
3. Execute the Setup.exe installation program on the disk and follow the instructions on the screen.
4. Remove the disk that contains the QLDIRECT driver.
5. Restart your system to load the driver.

### 6.4.2.2

## Updating to QLDIRECT from QLFILTER

The QLDIRECT driver replaces the QLogic QLFILTER driver. You must first uninstall the QLFILTER driver before installing the QLDIRECT driver.

Perform the following steps to update from the QLFILTER driver to the QLDIRECT driver:

1. Manually delete the Qlfilter.sys file from the following directory. For example:

```
del C:\Winnt\System32\Drivers\Qlfilter.sys
```

2. Manually remove the QLFILTER key from the following registry location:

```
\HKEY_LOCAL_MACHINE\System\CurrentControlSet  
\Services
```

3. Insert the disk that contains the QLDIRECT driver in an appropriate drive.
4. Execute the Setup.exe installation program on the disk and follow the instructions on the screen.
5. Remove the disk that contains the QLDIRECT driver.
6. Restart your system to load the driver.

## 6.5

### QL2x00IP NDIS Network Driver Installation

Your system must meet the following requirements for the QL2x00IP network driver interface specification (NDIS) network driver to function properly:

- The QL2300 SCSI miniport driver must be installed.
- The *Fast!Util Drivers Load RISC Code* adapter parameter must be enabled (see the FCode section that corresponds to your HBA).
- Windows 2000 networking software must be installed.
- All QLA22xx/QLA23xx HBAs on the network must have the same value set for the maximum transfer unit (MTU) size (IP configuration parameter).

If a QL2x00IP NDIS network driver is not installed on your system, perform the installation procedures in [section 6.5.1](#). If an older QL2x00IP network driver is already installed on your system, perform the update procedures in [section 6.5.2](#).

The following files are provided for installation:

- Netql2x.inf—driver installation script for the Windows 2000 setup program
- Ql2x00ip.sys—QLogic QL2x00IP NDIS driver for Windows 2000
- Ql2xipcu.exe—QLogic QL2x00IP Configuration Utility
- Release.txt—release notes for the QL2x00IP driver
- Readme.txt—readme file

### 6.5.1

## Initial Installation of the QL2x00IP NDIS Network Driver

Perform the following steps to install the QL2x00IP NDIS network driver:

1. Click the **Start** button, point to **Settings**, then click **Control Panel**.
2. Double-click the **Add/Remove Hardware** icon.
3. The **Add/Remove Hardware Wizard** welcome screen displays. Click **Next**.
4. In the **Choose a Hardware Task** dialog box, click **Add/Troubleshoot a device** and click **Next**.
5. In the **Choose a Hardware Device** dialog box, select **Add a new device** and click **Next**.
6. In the **Find New Hardware** dialog box, click **No, I want to select the hardware from a list** and click **Next**.
7. In the **Hardware Type** dialog box, select **Network Adapters** and click **Next**.
8. Insert the disk that contains the QLogic driver in an appropriate drive.
9. In the **Select Network Adapter** dialog box, click **Have Disk**.
10. Type the path to the QL2x00IP NDIS network driver. For example:  

```
A:\w2k\Ip
```
11. Click **OK**.
12. In the **Network Adapter** list, click **QLogic QLA2X00 PCI Adapter**, then click **Next**.
13. In the **Start Hardware Installation** dialog box, click **Next** to install the driver.
14. If the **Digital Signature Not Found** dialog box displays, click **Yes**.
15. In the **Add/Remove Hardware Wizard** dialog box, click **Finish** to complete the driver installation.
16. Modify the IP address parameters and driver parameters. [See section 6.5.3](#) for details.

### 6.5.2

## Updating the QL2x00IP NDIS Network Driver

Perform the following steps if a QL2x00IP NDIS network driver is already installed and you want to install an updated version of the driver:

1. Open a DOS command prompt window.
2. Change the current directory to the Windows 2000 driver directory. For example:

```
cd \winnt\System32\Drivers
```

3. Make a backup copy of the old driver. You can copy the file into the same directory with a .SAV extension indicating that it is the saved file. For example:

```
copy Ql2x00ip.sys Ql2x00ip.sav
```

4. Insert the disk that contains the updated QLogic driver in an appropriate drive.

5. Copy the new driver over the old driver. For example:

```
copy A:\W2k\Ip\Ql2x00ip.sys
```

6. Remove the disk that contains the QLogic driver.
7. Restart your system to load the updated driver.

### 6.5.3 QL2x00IP NDIS Driver Configuration

You must configure the IP address and modify the driver parameters during the initial installation (see section 6.5.1). You can also modify these later as appropriate using the following procedures.

The QL2x00IP NDIS driver provides drive configuration parameters. The drive configuration parameters are listed in table 6-1 and described in the following paragraphs.

**Table 6-1. Ql2x00ip.sys Configuration Parameters**

Parameter	Minimum	Maximum	Recommended Default
MTU Size	92	65280	8192
Buffer Count	8	128	32
Buffer Size	512	65536	4096
Header Split Size	24	Buffer size - 1	0 <sup>a</sup>
Adapter Node Name	—	—	—

Table Notes

<sup>a</sup>A value of 0 indicates that the headers and data are not split.

- **MTU Size.** This parameter specifies the maximum transfer or packet size that the host system sends or receives. All QLA22xx/QLA23xx HBAs on the same network must have the same MTU size value. QLogic recommends a default value of 8192.
- **Buffer Count.** This parameter specifies the number of receive buffers that the QL2x00IP driver allocates during initialization. The number of buffers multiplied by the buffer size must be greater than or equal to the MTU size. QLogic recommends a default value of 32.

- **Buffer Size.** This parameter specifies the size of each receive buffer. The buffer size multiplied by the number of buffers must be greater than or equal to the MTU size. Incoming packets cannot be broken into more than 23 buffers. Therefore, the buffer size multiplied by 23 must be at least as large as the MTU size. QLogic recommends a default value of 4096.
- **Header Split Size.** This parameter accounts for packets with split headers and data. The parameter value specifies the number of bytes at the beginning of an incoming packet that must be isolated in the first receive buffer. A value of 0 indicates that the packet header and data are not split. QLogic recommends a default value of 0.
- **Adapter Node Name.** This parameter specifies the world wide name (node name) of the QLA23xx HBA to use for this IP connection. The parameter is required on systems with more than one QLA23xx HBA. You can use *Fast!UTIL* to determine the node names for all QLA22xx/QLA23xx HBAs in the system (see the *Fast!UTIL* section that corresponds to your QLA23xx HBA).

Perform the following steps to make QL2x00IP NDIS driver parameter and IP address modifications:

1. Click **Start**, point to **Settings**, point to **Control Panel**, and double-click the **Network and Dial-Up Connections** icon.
2. Right-click the **Local Area Connection** icon for the QLA23xx HBA, then click **Properties**.

**NOTE:** If your system has multiple Local Area Connection icons, select the connection that uses the QLA23xx HBA that you are modifying.

3. In the **Local Area Connection n Properties** dialog box, select **Internet Protocol (TCP/IP)**.
4. In the **Internet Protocol (TCP/IP) Properties** dialog box, select **Use the following IP address**, then click **Properties**.
5. Type an IP address and subnet mask for the QLA23xx HBA. Each IP address must be unique and all QLA22xx/QLA23xx HBAs must use the same subnet mask. For example:

```
Adapter 1
  IP address: 10.0.0.1
  Subnet mask:255.255.0.0
```

```
Adapter 2
  IP address: 10.0.0.2
  Subnet mask:255.255.0.0
```

6. Click **OK**.
7. In the **Local Area Connection n Properties** dialog box, click **Configure**.

8. In the **QLogic QLA2X00 PCI Adapter #n Properties** dialog box, click the **Advanced** tab.
9. The **Property** list displays the configuration parameters. Click the parameter that you want to modify. The values display to the right.
10. Make configuration parameter modifications as necessary, then click **OK**.
11. In the **Local Area Connection n Properties** dialog box, click **OK**.
12. Restart the computer.

#### 6.5.4

### Removing the QL2x00IP NDIS Driver

If you need to remove the QLA2x00IP NDIS driver, perform the following steps:

1. Click the **Start** button, point to **Settings**, and then click **Control Panel**.
2. Double-click the **Add/Remove Hardware** icon.
3. The **Add/Remove Hardware Wizard** welcome screen displays. Click **Next**.
4. In the **Choose a Hardware Task** dialog box, click **Uninstall/Unplug a device** and click **Next**.
5. In the **Choose a Removal Task** dialog box, click **Uninstall a device** and click **Next**.
6. From the **Device** list, click the appropriate QLA23xx HBA. Click **Next**.
7. Click **Yes, I want to uninstall this device**. Click **Next**.
8. In the **Add/Remove Hardware Wizard** dialog box, click **Finish** to complete the removal of the driver.





# Section 7

## Windows XP Driver Installation (QL2300.SYS)

### 7.1

#### Introduction

This section provides instructions for installing the Windows XP driver under the following operating system conditions:

- Initial installation of Windows XP with the QLA23xx HBA as the boot device
- Initial installation of Windows XP with the QLA23xx HBA as an add-on
- Installation of the Windows XP driver in an already installed Windows XP operating system
- Installing an updated Windows XP driver in an already installed Windows XP operating system that has an older version of the driver

### 7.2

#### Creating the Driver Disk

Follow these steps to create driver disk containing the files needed to install the Windows XP driver:

1. Locate the driver you want on the QLogic web site (<http://www.qlogic.com>) and click **Link to driver**.
2. If prompted **What would you like to do with this file?**, choose **Save this program to disk**. Specify a temporary location on the hard drive and download the driver.
3. Insert a blank disk in drive A.
4. Run the self-extracting file you just downloaded, specifying **A:\** for **Unzip To Folder**.

### 7.3

#### Installing the Windows XP Driver

If you have not installed Windows XP, follow the instructions in [section 7.3.1](#) if the QLA23xx HBA is the boot device; follow the instructions in [section 7.3.2](#) if the QLA23xx HBA is not the boot device (add-on).

If Windows XP is installed, follow the instructions in [section 7.3.3](#) if this is the first time you are installing the Windows XP driver; follow the instructions in [section 7.3.4](#) to update an older version of the Windows XP driver.

### 7.3.1

## Installing Windows XP with the QLA23xx HBA as the Boot Device

Follow these steps to initially install Windows XP and the QL2300.SYS driver on the boot disk attached to the QLA23xx HBA:

1. Start the Windows XP installation using the Setup disks or CD-ROM (CD).
2. If you are booting from the CD, press F6 if you see the message **Press F6 if you want to install a third party SCSI or RAID Driver...**

After all the standard devices have been loaded, press S to **Specify Additional Device**. Go to [step 5](#).

3. If you are booting from the Setup disks, after the standard devices have been detected and configured, press S to **Specify Additional Device**.
4. Select **Other** and press ENTER.
5. Insert the QLogic disk created in [section 7.2](#) into drive A. Press ENTER.
6. The following message displays:

```
The software you are installing for this hardware:  
QLogic QLA22xx PCI Fibre Channel Adapter has not passed  
Windows Logo testing to verify its compatibility with  
Windows XP. Do you want to continue installing the  
software for this hardware?
```

Click **Yes** to continue with the installation.

7. Continue with standard installation procedure.

### 7.3.2

## Installing Windows XP with the QLA23xx HBA as an Add-On

Follow these steps to install Windows XP and the QL2300.SYS driver on a device that is not attached to the QLA23xx HBA:

1. Start the Windows XP installation procedure using the Setup disks or CD-ROM (CD).
2. If you are booting from the CD and the following message appears, press F6:

```
Press F6 if you need to install a third party SCSI or  
RAID Driver...
```

After all the standard devices have been loaded, press S to **Specify Additional Device**. Go to [step 4](#).

3. If you are booting from the Setup disks, after the standard devices have been detected and configured, press S to **Specify Additional Device**.

4. Insert the QLogic disk created in [section 7.2](#) into drive A. Press ENTER.
5. The following message displays:

```
The software you are installing for this hardware:  
QLogic QLA23xx PCI Fibre Channel Adapter has not passed  
Windows Logo testing to verify its compatibility with  
Windows XP. Do you want to continue installing the  
software for this hardware?
```

Click **Yes** to continue with the installation.

6. Press ENTER to select the **QLogic QLA2300 PCI Fibre Channel Adapter**.
7. After the system installs the required files to support the new QLA23xx HBA, press ENTER to continue with the Windows XP setup.
8. Continue with the standard installation procedure.

### 7.3.3

#### Installing the QL2300.SYS Driver

The QLA23xx HBAs are plug-and-play devices that are automatically detected by Windows XP. Perform the following steps to add the QL2300.SYS driver to a previously installed Windows XP system:

1. Connect the QLA23xx HBA to the appropriate slot on your computer.
2. Restart or power up your computer.
3. When your computer powers up, Windows detects the newly installed device, then displays the **Found New Hardware with SCSI controller** message. The **Found New Hardware Wizard** program is launched to begin installing the QL2300.SYS driver for the QLA23xx HBA.
4. Insert QLogic disk created in [section 7.2](#) into drive A.
5. Select **Search for a suitable driver for my device (recommended)**.

Click **Next**.

6. In the **Start Device Driver Installation** dialog box, click **Next**.
7. The following message displays:

```
The software you are installing for this hardware:  
QLogic QLA2300 PCI Fibre Channel Adapter has not passed  
Windows Logo testing to verify its compatibility with  
Windows XP. Do you want to continue installing the  
software for this hardware?
```

Click **Yes**.

8. In the **Upgrade Device Driver Wizard/Completing the Upgrade Device Driver Wizard** dialog box, click **Finish**.

9. The following message displays:

Your hardware settings have changed. You must restart your computer for these changes to take effect. Do you want to restart your computer now?

Click **Yes**.

**NOTE:** QLogic is in the process of obtaining a Digital Signature for the driver through the official WHQL process from Microsoft. Once a valid Digital Signature has been obtained and put in the CAT file, the Digital Signature Not found screen will not appear.

### 7.3.4 Updating the Existing QLA2300.SYS Driver

Perform the following steps if the QL2300.SYS driver is already installed and you want to install an updated version of the driver:

1. To start the **Device Manager**, click **Start**, right-click **My Computer**, click **Properties**, select **Hardware Tab (Top Bar) Open Device Manager**, then select **SCSI and RAID controller**.
2. Double-click **QLogic QLA2300 PCI Fibre Channel Adapter**.
3. Click the **Driver tab**, then click **Update Driver** to start the **Upgrade Device Driver Wizard**.
4. Insert the QLogic disk created in [section 7.2](#) into drive A. Select **Install the Software Automatically (Recommended)**.
5. When the **Qlogic XXXX has not passed Windows** logo displays, click **Continue Anyway**.
6. When the **Completing the Hardware Update Wizard** dialog box displays, click **Finish**.
7. Restart the system.

**NOTE:**

- QLogic is in the process of obtaining a Digital Signature for the driver through the official WHQL process from Microsoft. Once a valid Digital Signature has been obtained and put in the CAT file, the Digital Signature Not found screen will not appear.
- If the QL2300.SYS driver was previously installed and an additional QLA23xx HBA is added to the system, the HBA is detected when the system powers up. **The Found New Hardware with QLogic QLA2300 PCI Fibre Channel Adapter** message displays.

Follow these steps to complete the driver installation:

1. When the **Digital Signature Not Found** dialog box displays, click **Yes**.
2. When the **Insert Disk** message displays, insert the QLogic disk created in [section 7.2](#) into drive A. Click **OK**.
3. In the **Found New Hardware Wizard/Completing the Found New Hardware Wizard** dialog box, click **Finish**.
4. The following message displays:

Your hardware settings have changed. You must restart your computer for these changes to take effect.

Do you want to restart your computer now?

Click **Yes**.

## 7.4

### Removing the Driver

To uninstall the QLA23xx HBA, power down your computer and remove the HBA from your computer according to the manufacturer's instructions.

**NOTE:** You do not have to use the **Device Manager** or the **Hardware Wizard** to uninstall the QLA23xx HBA. After you have removed the HBA and restarted your computer, Windows XP recognizes that the HBA has been removed.

## 7.5

### System Registry Parameters

The available driver parameters are listed below and described in the following sections:

- MaximumSGList
- NumberOfRequests
- FCTape
- UseSameNN

#### 7.5.1

### MaximumSGList

Windows XP includes enhanced scatter/gather list support for doing large SCSI I/O transfers. Windows XP supports up to 256 scatter/gather segments of 4096 bytes each, allowing transfers up to 1048576 bytes.

**NOTE:** OEMSETUP.INF automatically updates the registry to support 33 scatter/gather segments. This setting provides the best overall performance.

To change this value, follow these steps:

1. Click **Start**, select **Run**, and open the **REGEDT32** program.
2. Select **HKEY\_LOCAL\_MACHINE** and follow the tree structure to the QL2300.SYS driver:

```
HKEY_LOCAL_MACHINE
  SYSTEM
    CurrentControlSet
      Services
        QI2300
          Parameters
            Device
```

3. Double-click **MaximumSGList:REG\_DWORD:0x21**.
4. Enter a value from 16 to 255 (10h to FFh). A value of 255 (FFh) enables the maximum 1-MB transfer size. Any value above 255 enables 64K transfers. The default value is 33 (21h).
5. Click **OK**.
6. Exit the **REGEDT32** program, then restart the system.

### 7.5.2

## NumberOfRequests

The NumberOfRequests registry parameter specifies the maximum number of outstanding requests per adapter. When the QL2300.SYS driver is installed, the registry is automatically updated with this parameter set to 150 (96h).

**CAUTION!** Increasing this parameter above 150 can result in a system failure.

### 7.5.3

## FCTape

Follow these steps to configure the QL2300.SYS driver to support FC tape:

1. Click **Start**, select **Run**, and open the **REGEDT32** program.
2. Select **HKEY\_LOCAL\_MACHINE** and follow the tree structure to the QL2300.SYS driver:

```
HKEY_LOCAL_MACHINE
  SYSTEM
    CurrentControlSet
      Services
        QI2300
          Parameters
            Device
```

3. Double-click **DriverParameters:REG\_SZ:MSCS=2;UseSameNN=1**.

4. If the string **FCTape=** does not display, add the following text to the end of the string:

```
;FCTape=1
```

5. If the string **FCTape=0** displays, change the value from 0 to 1.
6. Click **OK**.
7. Exit the **REGEDT32** program, then restart the system.

#### 7.5.4

### UseSameNN

If you have multiple QLA23xx HBAs on the same system, the driver assigns the world wide node name obtained from the first HBA to the rest of the HBAs.

If you want to have the world wide node name for each HBA to be based on its own NVRAM content, set the UseSameNN parameter to 0.

Follow these steps to change the UseSameNN parameter:

1. Click **Start**, select **Run**, and open the **REGEDT32** program.
2. Select **HKEY\_LOCAL\_MACHINE** and follow the tree structure to the QL2300.SYS driver:

```
HKEY_LOCAL_MACHINE
  SYSTEM
    CurrentControlSet
      Services
        QL2300
          Parameters
            Device
```

3. Double-click **DriverParameters:REG\_SZ:MSCS=2;UseSameNN=1**.
4. If the string **UseSameNN=** does not display, add the following text to the end of the string:

```
;UseSameNN=0
```

5. If the string **UseSameNN=1** displays, change the value from 1 to 0.
6. Click **OK**.
7. Exit the **REGEDT32** program, then restart the system.





# Section 8

## NetWare Driver Installation (QL2300.HAM)

### 8.1 Introduction

This section provides instructions for installing the NetWare driver in an already installed Novell NetWare 4.2, 5.x, or 6.x system.

**NOTE:** References to Novell NetWare 5.x and 6.x refer to versions that are currently supported by Novell.

### 8.2 NetWare Driver Files and Parameters

The latest versions of the software drivers and documentation for NetWare 4.2, 5.x, and 6.x are available on the QLogic Web site. Be sure to review the README.TXT file for both new and changed information.

You can load the QL2300.HAM driver with optional switches to modify driver functionality. The switches are described in [table 8-1](#).

**Table 8-1. QL2300.HAM Driver Parameters**

Parameter	Description
SLOT = n	This switch specifies the PCI slot (slot <i>n</i> ) in which the QLA23xx HBA is installed. The driver must be loaded once for each QLA23xx HBA in your system. For example: <code>LOAD QL2300.HAM SLOT=3</code>
/LUNS	This switch specifies that all logical unit number (LUN) devices are scanned after the driver loads. Otherwise, NetWare only scans for LUN 0 devices. This switch is required for multi-LUN storage subsystems, for example, RAID subsystems. For example: <code>LOAD QL2300.HAM SLOT=3 /LUNS</code>

### 8.3 Installing the NetWare Driver

**NOTE:** The QL2300.HAM driver may not be compatible with NetWare versions earlier than 4.2.

Perform the following steps to install the NetWare driver in a previously installed NetWare 4.2, 5.x, or 6.x system.

**NOTE:** The following procedure modifies your NetWare STARTUP.NCF file to load the driver automatically when your system boots.

1. Start NetWare and load the NetWare Install program from the NetWare server prompt (SERVERNAME:).

Type the following command when you are using NetWare 4.2:

```
LOAD INSTALL
```

Type the following command when you are using NetWare 5.x or 6.x:

```
LOAD NWCONFIG
```

2. Select **Driver options** from the main menu.
3. Select **Configure disk and storage device drivers**.
4. Select **Select an additional driver**.
5. Press INSERT to install an unlisted driver.
6. Insert the disk that contains the QLogic driver in an appropriate drive.
7. Press F3 and specify the root path as the disk drive (A:\).
8. Press ENTER to select the QL2300.HAM driver.
9. If prompted, select **Yes** to copy the driver.
10. You are prompted for the server directory. Type the path of the server directory, or press ENTER to accept the default.
11. If necessary, select **Select/Modify Driver Parameters** to modify the default settings.  
You can select a different PCI slot or select to not scan all LUNs. Press F10 to save the parameter settings.
12. Select **Save parameters and load driver** to complete the NetWare setup.
13. When finished, exit the installation program.

**NOTE:** If ASPI support is required for the SCSI devices, you must load the NWASPI.CDM module, which is provided by Novell. For example:

```
LOAD QL2300.HAM  
LOAD NWASPI.CDM
```

# Section 9

## Red Hat Linux Driver Installation

### 9.1

#### Introduction

This section provides instructions for installing the qla2300 Linux driver under the following operating system conditions:

- Initial installation of the Red Hat Linux 6.2 operating system and the qla2x00 (v4.x) driver
- Installing a new or upgrading an older version of the qla2x00 (v4.x) and qla2300 (v5.x and above) driver on an already installed Red Hat Linux 6.2, 7.0, 7.1, and 7.2 operating system.

The latest version of the software drivers and documentation for Red Hat Linux are available on the QLogic Web site. Be sure to review the README.qla2x00 and release.txt files for both new and changed information.

### 9.2

#### Creating the Driver Floppy Disk

To create a driver floppy disk for an initial installation of the Red Hat Linux 6.2 operating system and the qla2x00 driver, perform the procedures in [section 9.2.1](#). To create a driver floppy disk for installing a new or upgrading an older version of the qla2x00 driver on an already installed Red Hat Linux 6.2 or 7.0 operating system, perform the procedures in [section 9.2.2](#). To create a qla2x00 or qla2300 driver floppy disk that contains the source code (Red Hat Linux 6.2, 7.0, 7.1, and 7.2), perform the procedures in [section 9.2.3](#).

#### 9.2.1

##### Driver Floppy Disk 1 (New Operating System Installation)

Perform the following steps to create a driver floppy disk for an initial installation of the Red Hat Linux 6.2 operating system and the qla2x00 driver:

1. Download the rh\_boot4[1].xxx.zip file from the QLogic Web site.
2. If **What would you like to do with this file?** displays, select **Save this file to disk**.
3. Specify a temporary directory on the hard disk of the computer to store the driver. For example:

```
C:\temp
```

4. Download the driver to the temporary directory.

5. Insert a blank floppy disk.
6. Run the self-extracting file you downloaded. At the **Unzip To Folder** prompt, specify `A:\.`

Verify that the floppy disk contains the following files:

- modules.cgz
- modules.dep
- modinfo
- pcitable
- rhdd-6.1

### 9.2.2

## Driver Floppy Disk 2 (Installed Operating System)

Perform the following steps to create a driver floppy disk for installing a new or upgrading an older version of the qla2x00 driver on an already installed Red Hat Linux 6.2 or 7.0 operating system:

1. Download the qla2x00-x.xx-xx.i386.rpm file from the QLogic Web site.
2. If **What would you like to do with this file?** displays, select **Save this file to disk**.
3. Insert a blank floppy disk.
4. Download the file to the floppy disk.

### 9.2.3

## Source Code Driver Floppy Disk

Perform the following steps to create a qla2x00 or qla2300 driver floppy disk that contains the source code. This floppy disk can be created for use on Red Hat Linux 6.2, 7.0, 7.1, and 7.2.

1. Download the qla2x00src-vx.xx.tgz file from the QLogic Web site.
2. If **What would you like to do with this file?** displays, select **Save this file to disk**.
3. Insert a blank floppy disk.
4. Download the file to the floppy disk.

### 9.3

## Install a New Operating System and Driver (Red Hat Linux 6.2)

**NOTE:** To install the qla2x00 driver, the following requirements must be met:

- For Red Hat Linux 6.2, you must have created the qla2x00 driver floppy disk 1 (see section 9.2.1).
- The QLA23xx HBA must be installed in the system *before* installing the qla2x00 driver.
- The QLA23xx HBA must be the only boot device in the system during driver installation.

Perform the following steps to install the Red Hat Linux operating system and the qla2x00 driver for the first time. These steps outline the procedure when installing from an IDE CD-ROM.

1. Insert the Red Hat Installation disk and boot the computer.
2. When the computer comes up, the welcome window and boot prompt display. If you want to continue in text mode, type the following command. Otherwise, the installation continues in graphical mode.

```
boot: expert text
```

3. When the system prompts for the driver disk, insert the floppy disk 1 created in section 9.2.1. Tab to **OK**, then press ENTER.

**NOTE:** If you are installing Red Hat Linux 7.0 or later, you must complete the operating system installation, then continue with the instructions in sections 9.4.1 and 9.4.2 to add the driver.

4. After selecting the language and keyboard settings, the system prompts for the installation method. Select **Local CDRom**, then tab to **OK**.
5. When the system asks for devices, select **Add Device**. Select **SCSI** on the following screen. Tab to **OK**.
6. When the list of devices displays, select **QLogic QLA2100/2200/2300 qla2x00 V4.xx Driver**. The system loads the driver.
7. If the system detects the device for the selected module, the device is listed in the next screen under **I have found the following devices**. Select **Done**.
8. Continue the Red Hat installation with the loaded qla2x00 driver. Restart the system when the installation is complete.

### 9.4

## Install or Update the Driver (Installed Operating System)

Perform the following steps to install a new or upgrade an older version of the qla2x00 (v4.x) driver on an already installed Red Hat Linux operating system. The procedure consists of installing the driver on the boot drive (see section 9.4.1) and

loading the new driver automatically (see sections 9.4.2.1 and 9.4.2.2) or manually (see section 9.4.2). To load the qla2300 (v5.x) driver, see sections sections 9.4.2.2 and 9.4.2.3.

**NOTE:** You must have created driver floppy disk 2 (from section 9.2.2) and a source code driver floppy disk (from section 9.2.3) before installing or updating the driver.

### 9.4.1 Installing the Driver on the Boot Drive

**NOTE:** To install or update the qla2x00 driver, the following requirements must be met:

- For Red Hat Linux 6.2, you must have created the qla2x00 driver floppy disk 2 (see section 9.2.2).
- The QLA23xx HBA must be installed in the system *before* installing the qla2x00 driver.
- The QLA23xx HBA must be the only boot device in the system during qla2x00 driver installation.

Perform the following steps to install the qla2x00 driver on the boot drive.

1. Create a directory for the Red Hat Package Manager (RPM) files unless it already exists. For example:

```
# mkdir /home/qla2x00
```

2. Change the current directory to the QLogic Linux driver directory. For example:

```
cd /home/qla2x00
```

3. Insert the floppy disk that contains the qla2x00 driver.
4. Copy the driver files to the directory created in step 2. For example:

```
mcopy a:qla2x00-x.xx-xx.i386.rpm .
```

The period (.) at the end is required.

5. Do one of the following:

- To invoke the RPM and install the qla2x00 drivers for the first time, type:

```
# rpm -iv qla2x00-x.xx-xx.i386.rpm
```

- To upgrade the existing qla2x00 drivers, type:

```
# rpm -iv --force qla2x00-x.xx-xx.i386.rpm
```

The qla2x00 driver is now installed on your boot drive. However, the driver must be loaded before the system can access the devices attached to the QLA23xx HBA (see section 9.4.2).

## 9.4.2

### Loading the Driver

The qla2x00 or qla2300 driver must be loaded before the system can access the devices attached to the QLA23xx HBA. To build a custom kernel to automatically load the driver at boot time, see [section 9.4.2.1](#). To build a ramdisk image to automatically load the qla2x00 driver at boot time, see [section 9.4.2.2](#). To load the qla2x00 driver manually, see [section 9.4.2.3](#). To build a ramdisk image to automatically load the qla2300 driver at boot time, see [section 9.4.2.4](#). To load the qla2300 driver manually, see [section 9.4.2.5](#).

#### 9.4.2.1

### Building a Custom Kernel to Load the qla2x00 (v4.x) Driver Automatically

The kernel automatically loads the qla2x00 driver at boot time if you include it in a custom kernel. Perform the following steps to build a custom kernel:

1. Copy the qla2x00src-vx.xx.tgz file on the qla2x00 source code driver floppy disk you created in [section 9.2.3](#) to the /home/qla2x00 directory on the boot drive. Extract the driver source and additional information files from the .tgz file. For example:

```
# cd /home
# mkdir qla2x00
# cd /home/qla2x00
# mcopy a:*.tgz . (The period [,] at the end is required.)
# tar -xvzf qla*.tgz
```

2. Extract the kernel-header and kernel-source RPM files from the first Red Hat CD-ROM.

```
# cd /mnt/cdrom/RedHat/RPMS
# rpm -iv kernel-headers*.rpm
# rpm -iv kernel-source*.rpm
```

3. Add the driver to the kernel.

**NOTE:** These instructions are for qla2x00 (in Red Hat Linux 6.2, 7.0, 7.1, and 7.2). The line number listed may not be correct for other releases of the kernel.

The following details are from addkernel.txt, which can be obtained from the following source:

```
# tar -xvzf qla2x00src-x.xx.tgz
```

- a. If you have Red Hat Linux 6.2 and want the qla2x00 driver added as a choice in *make config*, *make menuconfig*, or *make xconfig*, add the following line to the `/usr/src/linux/drivers/scsi/Config.in` file after line 116:

```
dep_tristate 'QLA2x00 QLC driver support'  
CONFIG_SCSI_QLOGIC_QLA2100 $CONFIG_SCSI
```

- b. Copy all the zipped qla2x00 source files to the `/usr/src/linux/drivers/scsi` directory.

```
# cp /home/qla2x00/*.c /usr/src/linux/drivers/scsi  
# cp /home/qla2x00/*.h /usr/src/linux/drivers/scsi
```

- c. For Red Hat Linux 6.2, add the following lines to the Makefile in `/usr/src/linux/drivers/scsi`. Use the vi editor or equivalent text editor to edit the file.

After line 634 add:

```
***** (Makefile) *****  
ifeq ($(CONFIG_SCSI_QLOGIC_QLA2100),y)  
L_OBJS += qla2x00.o  
else  
    ifeq ($(CONFIG_SCSI_QLOGIC_QLA2100),m)  
        M_OBJS += qla2x00.o  
    endif  
endif  
***** (end) *****
```

After line 664 add the following. Use the TAB key to move the \$ (CC)....  
line:

```
***** (Makefile) *****  
qla2x00.o: ql2100_fw.h ql2200_fw.h ql2300_fw.h  
qla2x00.h qla2x00.c  
    $(CC) $(CFLAGS) -c qla2x00.c -o qla2x00.o  
***** (end) *****
```

After line 338 add:

```
***** (hosts.c) *****  
#ifdef CONFIG_SCSI_QLOGIC_QLA2100  
#include "qla2x00.h"  
#endif  
***** (end) *****
```



After line 609 add:

```
***** (hosts.c) *****
#ifdef CONFIG_SCSI_QLOGIC_QLA2100
    QLA2100_LINUX_TEMPLATE,
#endif
***** (end) *****
```

4. Build the kernel by first changing to the source directory.

```
# cd /usr/src/linux (for Red Hat Linux 6.2 and 7.0)
# cd /usr/src/linux-2.4 (for Red Hat Linux 7.1 and 7.2)
```

5. Type the following command to remove everything. You need to do this when you build a symmetric multiprocessor (SMP) kernel for the first time.

```
# make mrproper
```

6. Type the following command to access the **Main Menu**:

```
# make menuconfig
```

- a. From the **Main Menu**, select **SCSI support** and press ENTER.
- b. From the **SCSI Support Menu**, select **SCSI low-level drivers** and press ENTER.
- c. From the **SCSI Low-Level Drivers Menu**, scroll down and select **QLA2x00 QLC driver support <New>**. Press the SPACEBAR twice to select **QLA2x00 QLC driver support <New>**.
- d. Select **Exit** until you return to the **Main Menu**.
- e. If you are building an SMP kernel on an SMP system, do the following:
  - From the **Main Menu**, select **Processor type and features** and press the SPACEBAR.
  - From the **Processor Type and Features Menu**, select **Symmetric multiprocessor** and press the SPACEBAR.
  - Select **Exit** until you return to the **Main Menu**.
- f. To exit the **Main Menu**, select **Exit**.

The system prompts **Do you wish to save your new kernel configuration?** Select **Yes**. The system saves a new config file `.config` in the current directory.

7. Create a bootable kernel image by typing the following:

```
# make dep
# make bzImage
```

8. Copy the new kernel image to the boot directory. In the following example, `newsmp` is the label for the kernel image.

```
# cd arch/i386/boot
# cp bzImage /boot/newsmp
```

9. Modify the `/etc/lilo.conf` file to make the boot loader load a new image. For example:

```
image=/boot/newsmp
label=newsmp
root=/dev/hda5 (This is the location of the boot partition on your
system.)
read-only
```

In the above example, the lines tell the Linux boot loader to load the new kernel image called `newsmp` in `/boot` and mount the root partition using device `/dev/hda5`.

10. Change `default=linux` or `default=linux-up` to `default=newsmp`.
11. Load the new boot configuration by typing the following:

```
# lilo
```

The `lilo` program echoes the names of loadable kernels to the screen. For example:

```
newsmp *
```

12. Restart the system.
13. The new kernel image containing the `qla2x00` driver is now the default boot image.
14. Type the following command to determine whether your custom kernel is loaded:

```
# cat /proc/version
```

### 9.4.2.2

## Building a Ramdisk Image to Load the Driver Automatically

You can load the qla2x00 driver at boot time using a ramdisk image. For more information, refer to the Red Hat installation guide.

Perform the following steps to load the qla2x00 driver using a ramdisk image:

1. For Red Hat Linux 6.2, add the following line to the file `/etc/conf.modules`. For Red Hat Linux 7.0, 7.1, and 7.2, add the following line to the file `/etc/modules.conf`. For example:

```
alias scsi_hostadapter qla2x00
```

**NOTE:** If there are other SCSI HBAs installed on your system and the `scsi_hostadapter` alias is used, define a different alias (for example, `scsi_hostadaptern` (where *n* is a number from 1–9)).

2. Copy the object file to:

```
/lib/modules/<kernel release version>/scsi (Red Hat Linux 6.2 or 7.0)
```

```
/lib/modules/<kernel release version>/drivers/scsi (Red Hat Linux 7.1 and 7.2)
```

3. Build a new ramdisk image that contains the qla2x00.o object file.

For a single-processor system, type the following commands, where `x.x.xx-x.x` is the Red Hat Linux version number:

```
/sbin/mkinitrd /boot/newinitrd-image x.x.xx-x.x
```

For a multiprocessor system, type the following commands, where `x.x.xx-x.x` is the Red Hat Linux version number:

```
/sbin/mkinitrd /boot/newinitrd-image x.x.xx-x.x.smp
```

4. Modify the `/etc/lilo.conf` file to load the new ramdisk image. In the following examples, `.x.xx-x.x` is the Red Hat Linux version number.

For a single-processor system, change the following line from:

```
initrd=/boot/initrd-x.x.xx-x.x.img
```

to:

```
initrd=/boot/initrd-image
```

For a multiprocessor system, change the following line from:

```
initrd=/boot/initrd-x.x.xx-x.x.smp.img
```

to:

```
initrd=/boot/initrd-image
```

5. Type the following command to load the new lilo file:

```
# lilo
```

6. Restart the system. The qla2x00 driver loads automatically.

### 9.4.2.3

## Loading and Unloading the qla2x00 Driver Manually

Before loading the driver manually, first build the driver from the driver source files on the source code driver floppy disk (see section 9.5). After you manually load the qla2x00 driver, you can access the devices and unload the driver manually without restarting the system. The driver is also unloaded each time the system is restarted.

To load the qla2x00 driver, do one of the following:

- Copy the qla2x00.90 file:

- For Red Hat Linux 6.2 and 7.0:

```
/lib/modules/<kernel release version>/scsi directory
```

- For Red Hat Linux 7.1 and 7.2:

```
/lib/modules/<kernel release version>/drivers/scsi directory
```

Type the following command to load the driver:

```
# modprobe qla2x00
```

- Under the directory that contains the qla2x.00.o file, type:

```
# insmod qla2x00.o
```

Type the following command to unload the driver:

```
# modprobe -r qla2x00
```

### 9.4.2.4

## Building a Ramdisk Image to Load the qla2300 Driver

You can load the qla2300 driver at boot time using a ramdisk image.

1. For Red Hat Linux 6.2, add the following line to the file /etc/conf.modules. For Red Hat Linux 7.0, 7.1, and 7.2, add the following line to the file /etc/modules.conf. For example:

```
alias scsi_hostadapter qla2300
```

**NOTE:** If there are other SCSI HBAs installed on your system and the scsi\_hostadapter alias is used, define a different alias (for example, scsi\_hostadaptern (where n is a number in the range 1–9)).

2. Build a new ramdisk image that contains the qla2300.o object file. First, copy the object file to /lib/modules/<kernel release version>/scsi (Red Hat

Linux 6.2 and 7.0), or to `/lib/modules/<kernel release version>/drivers/scsi` (Red Hat Linux 7.1 and 7.2).

3. Add the dependency for the `qla2300` driver and build the ramdisk image.

You can either run “`depmod`” or make sure the following line is in the `/lib/modules/<kernel release version>/modules.dep` file:

```
/lib/modules/<kernel version>/kernel/drivers/scsi/  
qla2300.o: /lib/modules/<kernel version>/kernel/  
drivers/scsi/scsi_mod.o
```

4. Build the ramdisk image file.

For a single-processor system, type the following commands, where `x.x.xx-x.x` is the Red Hat Linux version number:

```
/sbin/mkinitrd /boot/newinitrd-image x.x.xx-x.x
```

For a multiprocessor system, type the following commands, where `x.x.xx-x.x` is the Red Hat Linux version number:

```
/sbin/mkinitrd /boot/newinitrd-image x.x.xx-x.xsmp
```

5. Modify the `/etc/lilo.conf` file to load the new ramdisk image.

For a single-processor system, change the following line, where `x.x.xx-x.x` is the Red Hat Linux version number.

```
initrd=/boot/initrd-x.x.xx-x.x.img
```

For a multiprocessor system, change the following line, where `x.x.xx-x.x` is the Red Hat Linux version number.

```
initrd=/boot/initrd-x.x.xx-x.x.smp.img
```

The new text is:

```
initrd=/boot/newinitrd-image
```

6. Type the following command to load the new lilo file:

```
# lilo
```

7. Restart the system. The `qla2300` driver loads automatically.

#### 9.4.2.5

### Loading and Unloading the `qla2300` Driver Manually

Before loading the driver manually, first build the driver from the driver source files obtained from the source code driver floppy disk (see section 9.5). After manually loading the `qla2300` driver, you can access the devices and unload the driver manually without restarting the system. The driver is also unloaded each time the system is restarted.

To load the qla2300 driver, do one of the following:

- For Red Hat Linux 6.2 and 7.0, copy qla2300.o to `/lib/modules/<kernel release version>/scsi` directory. For Red Hat Linux 7.1 and 7.2, copy qla2300.o to `/lib/modules/<kernel release version>/drivers/scsi` directory.
- Update the dependency file.

You can either run “depmod” or make sure that the following line is in the `/lib/modules/<kernel release version>/modules.dep` file:

```
/lib/modules/<kernel version>/kernel/drivers/scsi/qla2300.o:  
/lib/modules/<kernel version>/kernel/drivers/scsi/scsi_mod.o
```

- Type the following command:

```
# modprobe qla2300
```

- Under the directory that contains the qla2300.o file, type:

```
# insmod qla2300.o
```

Type the following to unload the qla2x00 driver manually:

```
# modprobe -r qla2300
```

## 9.5 Building a Driver from the Sources

If your Linux kernel version does not match the one built by QLogic prebuilt driver binaries, you need to build the driver in your configuration locally. To build a single-processor or uniprocessor (UP) version of the qla2x00 or qla2300 driver, [see section 9.5.1](#). To build a symmetric multiprocessor (SMP) version of the qla2x00 or qla2300 driver, [see section 9.5.2](#).

### 9.5.1 Building a Uniprocessor Version of the Driver

Perform the following steps to build a uniprocessor version of the qla2x00 driver:

1. Extract the kernel-header and kernel-source RPM files from the first Red Hat CD-ROM.

```
# cd /mnt/cdrom/RedHat/RPMS  
# rpm -iv kernel-headers*.rpm  
# rpm -iv kernel-source*.rpm
```

2. Using the source code driver floppy disk you created in [section 9.2.3](#), copy the qla2x00src-x.xx.tgz file to the `/home/qla2x00` directory.

```
# cd /home  
# mkdir qla2x00  
# cd /home/qla2x00  
# mcopy a:*.tgz . (The period [.] at the end is required.)  
# tar -xvzf qla*.tgz
```

3. Build the qla2x00 driver from the sources.

For Red Hat Linux 6.2 and 7.0, type:

```
# make
```

For Red Hat Linux 7.1 and 7.2, type:

```
# make OSVER=linux-2.4
```

4. Build the qla2300 driver from the sources.

For Red Hat Linux 7.1 and 7.2, type:

```
# make ISP2300=1
```

## 9.5.2

### Building a Multiprocessor Version of the Driver

Perform the following steps to build an SMP version of the qla2x00 driver:

1. If the QLogic SMP module is required to load with the Red Hat SMP kernel, it must be compiled with the same version number that was assigned to the original SMP kernel built by Red Hat. This step is not required for Red Hat Linux 7.0, 7.1, or 7.2.

For Red Hat Linux 6.2, in the `/usr/src/linux/include/linux/version.h` file, change the following line:

```
# define UTS_RELEASE "2.2.14-5.0"
```

to

```
# define UTS_RELEASE "2.2.14-5.0smp"
```

2. Extract the kernel-header and kernel-source RPM files from the first Red Hat CD-ROM.

```
# cd /mnt/cdrom/RedHat/RPMS  
# rpm -iv kernel-headers*.rpm  
# rpm -iv kernel-source*.rpm
```

3. Change to the Linux source directory.

For Red Hat 6.2 and 7.0, type:

```
# cd /usr/src/linux
```

For Red Hat 7.1 and 7.2, type:

```
# cd /usr/src/linux-2.4
```

4. Type the following command to access the **Main Menu**.

```
# make menuconfig
```

- a. From the **Main Menu**, select **Processor type and features** and press ENTER.
- b. From the **Processor Type and Features Menu**, select **Symmetric multiprocessor** and press the SPACEBAR.
- c. To exit the **Main Menu**, select **Exit**.

The system prompts **Do you wish to save your new kernel configuration?** Select **Yes**. The system saves a new config file `.config` in the current directory.

5. Type the following:

```
# make dep
```

6. Using the floppy disk you created in [section 9.2.3](#), copy the `qla2x00src-vx.xx.tgz` file to the `/home/qla2x00` directory.

```
# cd /home
# mkdir qla2x00
# cd /home/qla2x00
# mcopy a:*.tgz . (The period [.] at the end is required.)
# tar -xvzf qla*.tgz
```

7. Build the `qla2x00` driver from the sources.

For Red Hat Linux 6.0 and 7.0, type:

```
# make SMP=1
```

For Red Hat Linux 7.1 and 7.2, type:

```
# make SMP=1 OSVER=linux-2.4
```

8. Build the `qla2300` driver from the sources.

For Red Hat Linux 7.1 and 7.2, type:

```
# make SMP=1 ISP2300=1
```



# Section 10

## Solaris SPARC Driver Installation (QLA2300)

### 10.1

#### Introduction

This section provides instructions for installing the Solaris SPARC driver in an already installed Solaris SPARC operating system.

The latest version of the Solaris SPARC driver package is available on the QLogic Web site. The files in the driver package cannot be read nor installed from a DOS environment. Be sure to review the README.TXT file for both new and changed information.

To install the driver from a CD-ROM, see [section 10.2](#). To install the driver from the QLogic Web site, see [section 10.3](#). If you are installing the driver from another media, for example, a floppy disk, transfer the qla2300.Z file to a temporary directory on the machine where the driver is to be installed, then continue with [step 4](#) in [section 10.3](#).

### 10.2

#### Installing the Solaris SPARC Driver from a CD-ROM

Perform the following steps to install the Solaris SPARC driver from a CD-ROM to your system.

**NOTE:** To install the QLA2300 driver, you must have superuser privileges.

1. Log on to the system as superuser.
2. Create a temporary directory where you can copy the driver.
3. Change the directory (cd) to the CD-ROM mount point (usually /cdrom, but the location varies. Ask your system administrator for the specific directory).
4. Change the directory (cd) to the Solaris directory.
5. Copy (cp) the qla2300.Z file from the CD-ROM to the temporary directory created in [step 2](#).
6. Change the directory (cd) to the temporary directory created in [step 2](#).
7. At the command prompt, type:  

```
uncompress ./qla2300.Z
```
8. [Step 7](#) produces a file in the same directory called qla2300.

9. At the command prompt, type:

```
pkgadd -d ./qla2300
```

10. Continue with [step 7](#) in [section 10.3](#).

### 10.3

## Installing the Solaris SPARC Driver from the QLogic Web Site

Perform the following steps to download the Solaris SPARC driver from the web to your hard disk, then install the driver on your system.

**NOTE:** To install the QLA2300 driver, you must have superuser privileges.

1. Log on to the system as a superuser.
2. Download the driver package from the QLogic Web site (<http://www.qlogic.com>) to a directory on the Solaris machine's hard disk.
3. At the command prompt, change the directory (cd) to the directory where the file was downloaded.

4. At the command prompt, type:

```
uncompress ./qla2300.Z
```

5. [Step 4](#) produces a file in the same directory called qla2300.
6. At the command prompt in the directory where the file was uncompressed, type:

```
pkgadd -d ./qla2300
```

7. You are prompted to select a driver package. For example:

```
The following packages are available:
```

```
1  QLA2300-1  QLogic QLA2300 driver
      (sparc) Solaris 2.6, Rev=X.XX

2  QLA2300-2  QLogic QLA2300 driver
      (sparc) Solaris 2.7, Rev=X.XX

3  QLA2300-3  QLogic QLA2300 driver
      (sparc) Solaris 8-9, Rev=X.XX
```

```
Select package(s) you wish to process (or 'all'
to process all packages). (default: all)
[? , ?? , q] : 3
```

**NOTE:** The revision number, X.XX, indicates the most recent version of the driver.

8. Type the number associated with the Solaris SPARC version on your system and press ENTER to continue.

9. You are prompted to select the directory where the driver will be installed. For example:

```
Processing package instance <QLA2300-3> from
</qla2300>

QLogic QLA2300 driver
(sparc) Solaris 8-9, Rev=X.XX

Copyright (c) 1996-2002, by QLogic Corporation. All
rights reserved.

Where do you want the driver object installed
(default=/kernel/drv):
```

10. Press ENTER to accept the default.
11. The pkgadd program performs a series of checks, then posts a script warning and asks whether to continue the installation. For example:

```
##Executing checkinstll script.
Using </> as the package base directory.
## Processing package information.
## Processing system information.
## Verifying disk space requirements.
## Checking for conflicts with packages already
installed.
## Checking for setuid/setgid programs.

This package contains scripts which will be executed
with super-user permission during the process of
installing this package.

Do you want to continue with the installation of
<QLA2300-3> [y,n,?]
```

12. Type `y` and press ENTER to continue the driver installation. The pkgadd program notifies you when the driver installation is complete. For example:

```
Installing QLogic QLA2300 driver as <QLA2300-3>

## Installing part 1 of 1.
/kernel/drv/qla2300
/kernel/drv/qla2300.conf
[ verifying class <none> ]
## Executing postinstall script

Installation of <QLA2300-3> was successful.
```

13. Type the following text to restart and reconfigure the system:

```
reboot -- -r
```

**10.4**  
**FCode**

If you need FCode, see the appropriate section for instructions on how to install or update the FCode on the QLA23xx HBA.